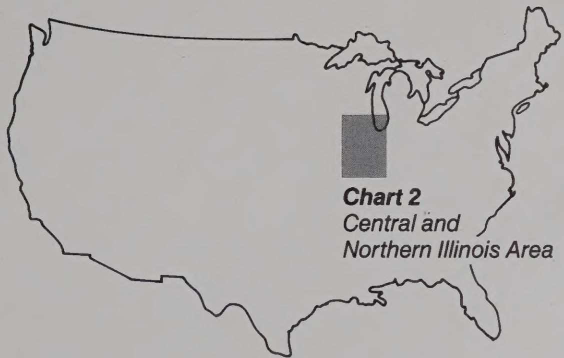

Legend

	Civil—Public use airport
®	Restricted/Private—Nonpublic use airport, having emergency use or landmark value
☆	Rotating light in operation, sunset to sunrise
NAME CT 124.4 206	Airport name Control Tower (CT)—Primary frequency Elevation in feet
NAME ATIS 118.0	Airport name Automatic Terminal Information Service—Communication radio frequency
NFCT	Non-Federal Control Tower
⊙	VOR (VHF Omni Range)—Civilian navigation beacon
	VORTAC (VHF Omni Range TACAN)—Civilian and military navigation beacon
JOLIET 112.3	VOR—Navigation radio frequency
VOR (T) KANKAKEE 111.6	VOR(T)—Terminal VOR

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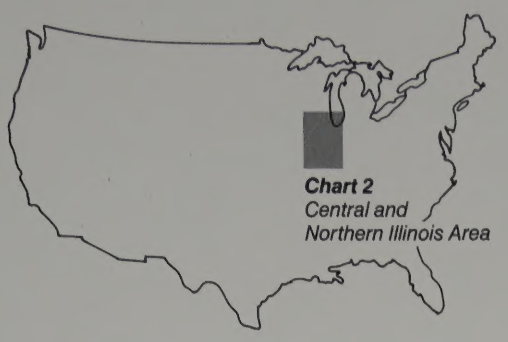

Legend

	Civil—Public use airport
®	Restricted/Private—Nonpublic use airport, having emergency use or landmark value
☆	Rotating light in operation, sunset to sunrise
NAME CT 124.4 206	Airport name Control Tower (CT)—Primary frequency Elevation in feet
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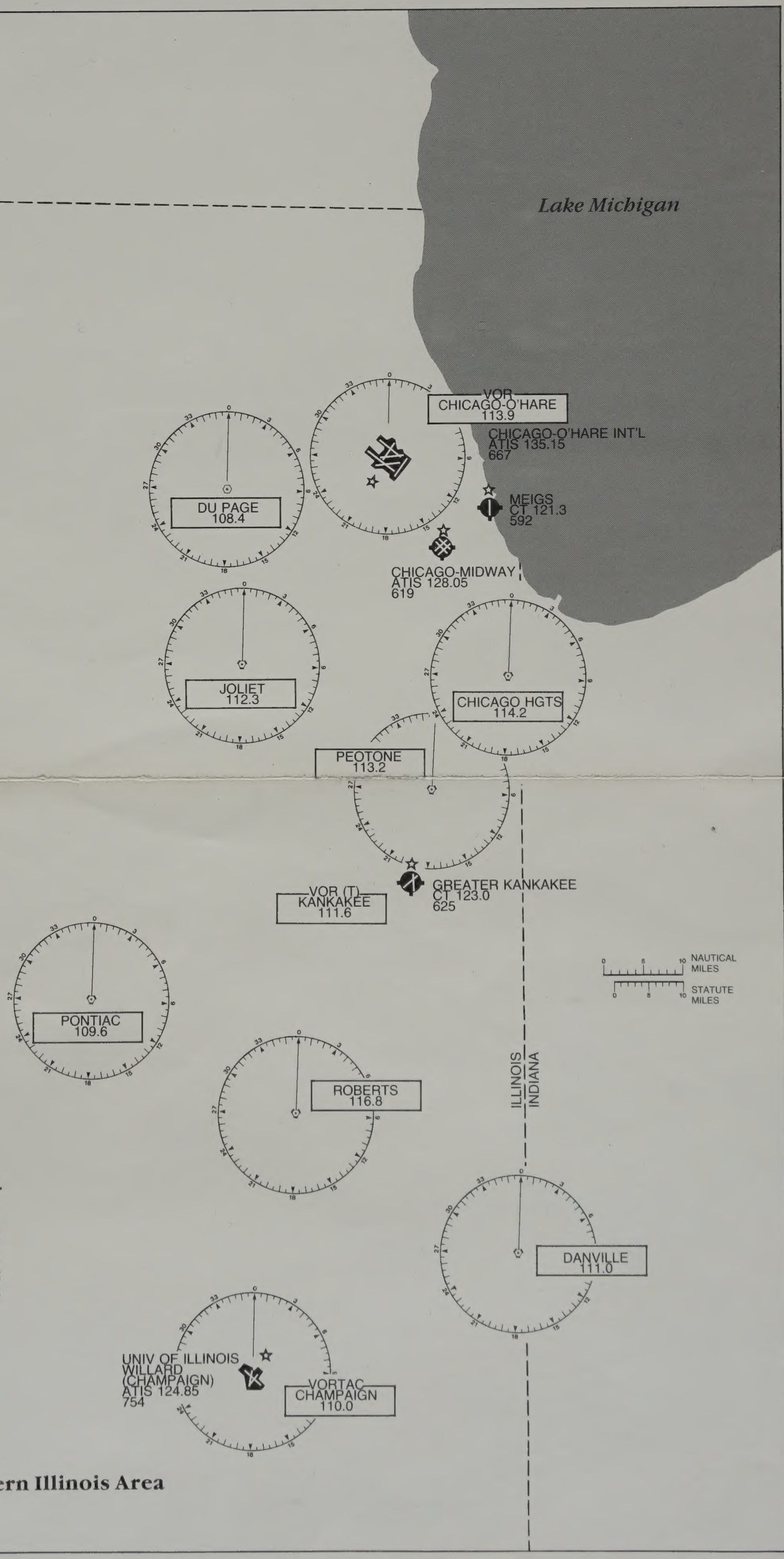


NOTAM
Notice to Airmen

See Chicago Sectional Aeronautical Chart for details.

Localizer frequencies will be provided by ATIS at the selected airport. Those frequencies agree with Instrument Approach Procedures.

If no ATIS is available (at Meigs, for example) tune in the control tower frequency (CT) for information.

AIRPORT COORDINATES

	North*	East*	Alt.
Chicago-Midway	17156	16628	619
Chicago-O'Hare	17243	16578	667
Greater Kankakee	16846	16597	625
Meigs	17189	16671	592
Willard	16400	16465	754

*North and east coordinates align with orthogonal coordinate grid overlaid on Lambert Conformal Conic Projection.

Chart 2. Central and Northern Illinois Area

For use with the
Microsoft Flight Simulator

A

AIRCRAFT COMMUNICATIONS

This tutorial covers communications techniques in various facets of flight operation.

In operating an aircraft there are a variety of situations that require a variety of communications techniques. In this tutorial it is broken down to:

Initial start-up & taxi
Departure
Enroute
Approach
Landing
Taxi to parking & shut-down

In addition, the type of communicating done depends on if you are flying VFR (Visual Flight Rules) or IFR (Instrument Flight Rules).

Terms used in this chapter & their definitions

Unicom: Unicom is a "open air" radio frequency that is used at uncontrolled & controlled airports.

Clearance Delivery: A frequency used by a Control Tower to issue instrument & VFR clearances. In some cases Clearance Delivery may be a frequency that goes direct to a near-by ARTCC (Air Route Traffic Control Center).

Air Route Traffic Control Center (Center): The United States airspace, and that of other nations is broken up into various "Centers." More or less the fewer the airplanes that fly in that Center's airspace the larger the geographical area that Center covers. Centers are in turn broken down into Sectors whose size is also dependent on aircraft volume.

FAR's: Federal Aviation Regulations. The rules the United States Government, by way of the Federal Aviation Administration, publishes for aircraft and administrative operations.

note: Operations discussed in this chapter are based on those used in the United States. The authors of the X-Plane Manual welcome input from our friends in other countries as to specifics of operations in other nations.

Flight Service Station (FSS):

These are the people that take weather observations, give you your weather briefings etc. They used to be at the major fields, but funding cuts and down-sizing have made your chances of having a face-to-face briefing rather rare.

ATIS (Automatic Terminal Information Service):

Continuous broadcast on a discreet radio frequency of an airports weather conditions and terminal procedures. Updated hourly, or as changing weather dictates. Each change gets a new phonetic name: "Information Alpha", "Information Bravo", etc.

The ramp:

The parking area for aircraft at an airport. When calling for taxi clearance, or traffic advisories you may refer to your location as "the ramp." With more than one parking area you may have terms like "North ramp", "Shamrock Aviation Ramp" etc.

VFR DEPARTURE, VFR ENROUTE, VFR LANDING

Initial start-up, taxi:

O.K., you're on the ramp in your Cessna, N1557G. Your fueled, received your weather briefing, done your preflight inspection of the aircraft and are ready to go. If there is no tower at the field, you make a blind broadcast on the fields Unicom frequency along the line of "Mayfield traffic, Cessna 1557Golf is taxing out from the North ramp area for departure on runway 36."

Departure:

Once youíre ready to go and the airspace is clear make another blind call "Mayfield traffic, Cessna 1557Golf is taking the runway, runway 36 at Mayfield". After lift off another call is made "Mayfield traffic, Cessna 1557Golf is off of runway 36 and departing VFR east bound".

Enroute:

Once enroute it gets pretty quiet on the radio. If you have filed a VFR flight plan, give the nearest FSS a call and open your flight plan with your time of departure. If you are familiar with the folks at the airport that you just left you can also call them on the Unicom and ask them to contact the FSS and open your VFR flight plan.

Traffic advisories enroute:

If you know the frequency of the Center in the area you are flying in (published on some VFR charts) you can give them a call for traffic advisories. This call up would go along the lines: "Memphis Center, Cessna 1557Golf" Center replies: "Cessna 1557Golf, Memphis Center, go ahead" You: "Memphis Center, Cessna 1557Golf, VFR enroute from Mayfield to Farview at 6,500 feet- advisories if you have the time please." Memphis may come back and say "Roger Cessna 1557Golf, squawk 12345 and ident please." You dial in the 1234 code in your transponder and hit the ident button. (Assuming you do this in a timely fashion, there is no reason to call Memphis Center back and say "Roger, squawk 1234 and ident." The controller will see your target "bloom" on his scope & know you received his call. By not reading this instruction back you help to keep the sometimes crowed airwaves a

little less busy.)

So, Memphis comes back and says "Cessna 1557Golf radar contact 10 miles east of the Mayfield airport. Maintain VFR. Advise me of any altitude changes and stand by for advisories." That's it- now you have an extra pair of eyes looking out for you, and Center knows who you are & what your intentions are. However, during busy periods Center may just as well come back after your initial contact and say "Cessna 1557Golf no time for advisories at this time. Good day."

Either way, keep those eyeballs peeled for traffic. VFR advisories to you are way down on the Center's list of priorities- they are under no obligation to call all traffic for you. When you reach the edge of the Controller's airspace he will call you with something like "Cessna 1557Golf for continued VFR advisories contact Memphis Center on 124.75. Good day." Once again, unless you didn't catch the frequency, a simple reply of "Good day" will do.

You contact the next sector on 124.75 and start the whole procedure all over again.

As you near your destination airport of Fairview Center may, or may not, hand you off to the appropriate controller. Getting traffic advisories from Center is a freebie, just a little edge to make your flight that much safer, but it can be dropped at any time by ARTC. Also, keep in mind that you are obligated to advise them of any altitude changes you make. So, when you decide it's time to start down make a call like "Center, Cessna 1557Golf is out of 6,500 VFR for 3,500."

Approaching you destination airport:

If you have been "handed off" by Center you will reach a point where you will descend below their minimum controlling altitude. At this point they will call and state "Cessna 1557G Radar services terminated, 15 miles west of Fairview. Good day." On the other hand, Center may hand you off to Approach Control if your destination airport lies in the area of a controlling facility or if you have to cross through their airspace to get to your destination. In some cases Approach will keep you until you're near your airport and turn you loose with a "Cessna 1557G radar services terminated, Fairview airport is your 12 oíclock and 8 miles. I see two aircraft in their traffic pattern. Good day." (Now that's good service. Once again, it all depends on the controllers work load and his radar coverage.)

As you near Fairview tune in the appropriate Unicom frequency. Find out what the winds are by listening to traffic from Fairview or near-by airports. Tune in the ATIS from a near-by airport, check your weather briefing- do everything possible to get an idea of what the surface wind, and therefore the active runway will be at your destination.

About 5 miles out make a call to the Fairview Unicom "Fairview Unicom, Cessna 1557Golf". They may or may not be maning the Unicom radio at Fairview. If they reply "Cessna 1557Golf, Fairview Unicom- go ahead" Or, if they are really heads-up (and busy) "Cessna 1557Golf Fairview Unicom. Fairview landing and departing on runway 27. Numerous aircraft in the pattern." You reply "Fairview Unicom, Cessna 1557Golf is 5 miles west landing. We'll make pattern calls."

If Fairview Unicom doesn't answer, make a blind call from your 5 mile out position "Fairview traffic (You're trying to reach the people flying around Fairview now, not the person who did or didn't answer you on the Unicom radio. That's why you say "traffic" instead of "unicom".) Cessna 1557Golf is 5 miles west of the Fairview airport, landing Fairview."

Landing:

As you enter the pattern (usually on an upwind leg) make a blind call "Fairview traffic, Cessna 57Golf entering upwind for runway 27, Fairview." Now that repeat of Fairview, saying it at the beginning and the end of your transmission can be important. Here's why. Someone else may just hear a part of your transmission, and by saying "Fairview" at both ends of your transmission you just might catch their ear- it's just one extra word, and it can't hurt. O.K., now you turn downwind: "Fairview traffic, Cessna 57Golf is on a left downwind, runway 27, Fairview." Turning final: "Fairview traffic, Cessna 57Golf is on a one mile final, runway 27, Fairview."

Taxi to parking & shut-down:

You land, turn off of the runway and make one last call "Fairview traffic, 57Golf is on the ground and clear of the runway."
Taxi your aircraft in, turn your transponder to "stand-by", and your job is done. Well, one last thing- don't forget to call Flight Service and cancel your VFR flight plan.

IFR DEPARTURE, IFR ENROUTE, IFR LANDING

Initial start-up, taxi:

O.K., you're on the ramp in your Cessna, N1557Golf. Your fueled, done your weather briefing, filed your IFR flight plan, done your preflight inspection of the aircraft and are ready to go.

Clearance Delivery:

If you are at a larger airport it may have Clearance Delivery, a convenient service devoted to handing out IFR clearances to departing aircraft. If this is the case, listen to the ATIS and contact Clearance Delivery before leaving the ramp. "Clearance, Cessna 1557Golf, instruments to Fairview, Bravo (the current ATIS)". Clearance comes back with something like "Cessna 1557Golf you are cleared to the Fairview airport as filed, climb and maintain 5,000 expect filed altitude 10 minutes after departure. After departure fly runway heading, departure frequency will be 124.75."

You can read this back any way you want to, from a direct quote to an abbreviated one that covers all the important stuff: "Roger, 1557Golf cleared as filed, maintain 5,000, expect higher 10 minutes after, runway heading, 124.75." If Clearance is satisfied that you have the information correct they will generally come back with "Roger, contact Ground on 121.9." And usually, if you don't tell Clearance Delivery that you have the current ATIS they will invariably ask- might as well tell them that you do on initial contact. Lastly, at

some busy terminals Clearance will also issue your initial taxi instructions.

Other ways to get your clearance:

There are a multitude of ways to get your IFR clearance. You can get it by phone from Center or a near-by FSS with a "clearance void if not off by (time)", at some airports line-of-sight radio communications permit contacting Center directly, or from a FSS etc. If the weather permits VFR flight from your departure field you can depart and pick up your clearance when airborne.

Ground Control:

If there is no Clearance Delivery then Ground Control will issue your clearance for you.

Departure:

After departure you just fly your clearance. For those interested in lost communications procedures it is best to read the Federal Aviation Regulations- this subject can get quite complex.

Enroute:
Once enroute follow your flight plan and the requests from Center. Try to keep in mind good radio operating procedures and to not burden the airwaves with unnecessary "chatter." For example, if Center asks for an ident just press the "ident" button on your transponder- they'll see your target bloom and you just saved saying "Roger, 1557Golf ident." Also, when you check in on a new frequency tell them what altitude you are at, they'll want to verify it anyway "Center, Cessna 1557Golf with you, 9,000."

Approach:
As you near your destination of Fairview, Center may start you down to a lower altitude. At some point, depending on the airspace your destination of Fairview is located in, you will be handed off to:

A sector frequency if your destination is not under the control of a Approach Control or Tower. In this case you will receive a "Cessna 1557Golf contact Center on 125.75." You call them and receive "Roger 1557G you are cleared to the Namit Intersection, descend and maintain 4,000." "1557Golf cleared to Namit, we are out of 5,000 for 4,000." And a little down the line "Cessna 1557Golf is cleared for the approach to Fairview, maintain at or above 4,000, report Namit outbound." "Cleared the approach, at or above 4,000, we'll call Namit outbound."

If you are really out in the boonies Center may call with: "Cessna 1557Golf, how do you intend to cancel your IFR?" This is a really good clue that there probably is no radar coverage all the way to the ground, and that communications with Center via radio once near or on the ground is not possible. Your options are to call the nearest FSS by land line (telephone), call Center by land line (ask now for a telephone number) or if the weather is decent, and you have good VFR conditions, cancel your IFR at this point.

Approach Control if Fairview is near a major airport, or you have to traverse a major

airportís airspace to get there. "Cessna 1557Golf contact Big City Approach Control on 123.55." You reply "123.55, good day." (It's a good idea to tune in Big City ATIS if they have one as far out as possible so that you can have the appropriate approach in mind for Fairview if there is more than one.) "Good morning Big City Approach, Cessna 1557Golf, out of four point seven for four, we have Big City Information Whiskey, landing Fairview." (The controller's strip shows you landing at Fairview, but it eliminates the possibility of your being vectored to the Big City airport by accident- it happens. "Roger 57Golf, turn left heading 080, descend and maintain 3,500. The Fairview airport is your 12 oíclock and 15 miles."

You may be asked to state which approach you intend to shoot into Fairview if there is more than one- be prepared to answer. "Cessna 1557Golf is 5 miles West of the Fairview VOR, turn right heading 085, descend and maintain 3,000, you're cleared the VOR 18 approach at Fairview, maintain at or above 3,000 until on a published segment of the approach, report the VOR inbound." "Cleared the VOR 18 approach, right to 085 and out of three point five for 3,000, at or above 3,000 until established- 57Golf" Assuming that Approach will vector you in for a straight-in approach (they usually will) you maintain at or above 3,500 until you are on a published segment of the approach- sector, radial, DME arc etc. At the VOR inbound you call Approach with: "Approach, 57Golf is Fairview VOR inbound, out of (whatever the Final Approach Fix altitude is)."

You commence your descent at the VOR, or whatever the Final Approach Fix is & follow the published procedure to Fairview- which, due to you expertise, looms right in front of you, just where it should be. A note of caution here. If Fairview is an uncontrolled airport, there may be traffic flying around in the pattern even though ceilings and visibilities are low.

Just because you are on an instrument approach does not mean that you have the right of way to the landing runway. If you have two radios it is a good idea to "guard" the Unicom frequency for Fairview. If you have a chance, make a call on the Unicom "Fairview traffic, Cessna 1557Golf is IFR inbound from the Fairview VOR." It can't hurt. If Fairview has a tower your clearance from Approach will be to ".....contact the Fairview Tower at the VOR inbound." or something along that line. And, if there is a Tower they will keep traffic clear for your landing.

Landing, Taxi to parking & shut-down:

After landing, be certain to turn you transponder to "standby" so that you don't needlessly clutter up Approach Control's scope. Taxi to parking, shut-down and sit there for a moment evaluating how you handled your flight. Did you make any errors? (Pretty tough not to in today's complex airspace and procedures.) What should you have done, what will you change next time, etc.

Remarks:

It is impossible of course to cover all of the possible scenarios for instrument flight. This example is meant as an over-all guide to flight operations so that you can enjoy your "X-Plane experience" that much more.

If the reader feels that any of the above is confusing, in error, or should be elaborated on, please contact me.

Thank you.

stoenworks@macconnect.com

Return to the Turtorials Page

June, 2002

Runways and Taxiways

Ok, a possible boring subject. But knowing what all of those painted lines, signs and various other markings on the airport's surface mean is important for safe aircraft operation. And, as the graphics on flight simulators continue to improve, more and more detail on the airport surface is being displayed.

Surface

There are a variety of runway surfaces: dirt, gravel, sod, concrete, asphalt and water among them. In this tutorial we'll confine the discussion to the concrete and asphalt versions.

A Word (or more) About Sod

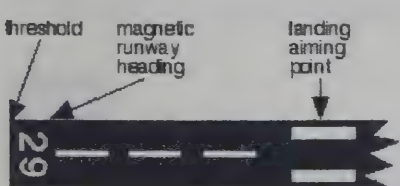
If you have never operated out of a sod/grass airport you should give it a try some day. There are some stinkers out there that are riddled with gullies and gopher holes, but a well maintained sod strip is a thing of beauty to operate on. Generally speaking, your landing distance will be about the same as on the hard surfaced variety, with brake effectiveness similar unless you apply hard braking and skid. Be aware that your accelerate/stop distance will be longer, and that wet grass, from morning dew or rain, will severly limit braking abilities.

When landing at a sod field that you are not familiar with, pay close attention to the condition of the field as you fly the pattern. If the surface wind is blowing the grass in a wavy pattern it's a definate sign that the grass is perhaps too long for safe operation. Try to avoid hard braking turns so that you don't damage the field. Most sod field operators pride themselves on their distinctivness, and keep their airports in excellent condition.

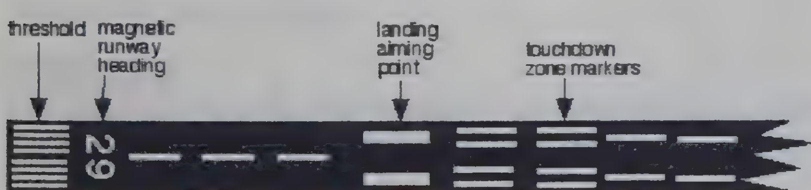
The Hard Stuff

Basically, there are two types of runways: Visual, and Instrument. It makes no never mind to your airplane, but it does to the FAA (Federal Aviation Administration). (Note that these, and other markings, are *recommend* by the FAA. Variations can, and do, appear at some fields.)

This is how a "Visual runway" is marked:



This is how a "Instrument runway" is marked:



Threshold markings Four stripes on either side of the centerline at the end of the runway.

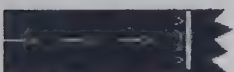
Magnetic runway heading A whole number, to the nearest one-tenth of Magnetic North. Additional parallel runways are labeled "L" (left). "R" (right), and "C" (center).

Landing aiming point Yep, you guessed it- this is the spot that you aim for. Meant as a visual cue, it is generally 1,000 feet from the threshold.

Side stripes (Not shown) These are white stripes running along each side of the runway.

Touchdown zone markers Meant to help define the touchdown zone, they show distance information in 500 foot increments. (The above drawing is illustrative only, and not to scale.)

Displaced threshold


This is used when the *landing* threshold is other than the end of the runway. Usually it is because of obstructions in the approach path, however it may also be there to increase the height of landing aircraft over noise sensitive areas, among other reasons. The area between the end of the runway and the Displaced Threshold *may be used* for landing rollouts from the opposite direction, *and* for takeoff operations.

Chevrons


Chevrons are used on pavement areas that are alligned with the runway, but the surface is unuseable for aircraft operations- don't go there.

Closed runway

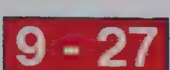
The yellow "X" denotes that the runway is closed to all operations: landing, takeoff and taxing. Be advised that this symbol is usually only used for long-term situations, and that runways may be closed to activity without an "X" being displayed. Always check NOTAMs. (NOtices To AirMen.)

Distance to go markers

Usually found only at military facilities, but becoming increasingly popular at civilian airports too. The number denotes the distance remaining, in thousands of feet.

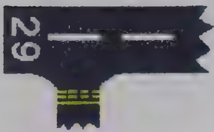
In this case, there is 5,000 feet of remaining runway. The last sign ("1"- one thousand feet to go), will be no less than 950 feet from the end of the runway.

Runway designator signs



Show the runway that you are approaching. In this case, the departure end of runway 9 is to your left and the departure end of runway 27 is to your right.

Runway holding position



As you approach the runway you will find this marking. You may not cross this line on an active runway unless you have the permission of the tower, or at an uncontrolled field until you verify that the runway is clear. If you are crossing a non-active runway in the act of taxing to an active runway, you do not need authorization to proceed through this marking- it only applies to active runways.

Helicopter landing areas

Designated civilian helicopter landing area.

Designated hospital helicopter landing area.

And lastlly

There are more markings, nothing in aviation is simple. But this pretty well covers those that you are likely to see.

If you have any suggested additions or corrections, please contact me. 

Fly safely.

June, 2002

General Aviation Frequencies

34.15 - Army Helicopters
34.65 - Army Helicopters
34.75 - Army Helicopters
41.50 - Army Helicopter Towers
121.500 - Emergencies
121.600 - C.A.P. Training Beacons
121.650 - Ground Control
121.700 - Ground Control
121.750 - Ground Control
121.800 - Ground Control
121.850 - Ground Control
121.900 - Ground Control
121.950 - Flight Schools
122.000 - Flight Advisory Service
122.100 - Flight Service Stations
122.200 - Flight Service Stations
122.250 - Balloons
122.400 - Flight Service Stations
122.600 - Flight Service Stations
122.700 - Unicom - Uncontrolled airports
122.725 - Unicom - Private airports
122.750 - Unicom - Air-to-air communications
122.800 - Unicom - Uncontrolled airports
122.850 - Multicom
122.900 - Uncontrolled airports & search & rescue training
122.925 - Multicom
122.950 - Unicom - Controlled airports
123.000 - Unicom - Uncontrolled airports
123.025 - Helicopters - Air-to-air communications
123.050 - Unicom - Heliports
123.075 - Unicom - Heliports
123.100 - Search & Rescue/C.A.P.
123.200 - Flight Schools
123.300 - Flight Schools & balloons
123.400 - Flight Schools
123.450 - Air-to-air communications (unofficial)
123.500 - Flight Schools & balloons
123.600 - Flight Service Stations - Uncontrolled airports
123.650 - Flight Service
126.200 - Military Airports
130.650 - Military Airlift Command
134.100 - Military Airports - GCA Radar
148.125 - Civil Air Patrol Repeaters - Secondary
148.150 - Civil Air Patrol Repeaters - Primary
156.300 - Aircraft-to-ship - safety
156.400 - Aircraft-to-ship - commercial
156.425 - Aircraft-to-ship - non-commercial
156.450 - Aircraft-to-ship - commercial

156.625 - Aircraft-to-ship - non-commercial
156.900 - Aircraft-to-ship - commercial
236.600 - USAF Towers
237.900 - USCG Search & rescue
239.800 - FAA Weather
241.000 - Army/National Guard "Guard"
243.000 - Military Emergency "Guard"
250.800 - US Navy Blue Angels
251.600 - US Navy Blue Angels
252.800 - USAF Tactical training
255.400 - Flight Advisory Service
257.800 - Civilian Towers
266.500 - USAF Air-to-air refueling
283.500 - USAF Thunderbirds
287.800 - USCG Search & rescue
300.600 - US Navy Air-to-air training
311.000 - STRATCOM Primary
319.400 - Military Airlift Command
321.000 - STRATCOM Secondary
325.500 - FAA Weather
342.500 - FAA Weather
344.600 - FAA Weather
349.400 - USAF Towers
364.200 - NORAD A.I.C.C.
381.300 - USAF A.C.C. Primary
381.800 - USCG - Primary

Scanning Homepage

Created and maintained by Jim Fordyce (scanning@fordyce.org).
Comments, corrections and additions are welcomed.

Section 3. Airport Operations

4-3-1. General

Increased traffic congestion, aircraft in climb and descent attitudes, and pilot preoccupation with cockpit duties are some factors that increase the hazardous accident potential near the airport. The situation is further compounded when the weather is marginal, that is, just meeting VFR requirements. Pilots must be particularly alert when operating in the vicinity of an airport. This section defines some rules, practices, and procedures that pilots should be familiar with and adhere to for safe airport operations.

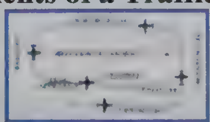
4-3-2. Airports with an Operating Control Tower

a. When operating at an airport where traffic control is being exercised by a control tower, pilots are required to maintain two-way radio contact with the tower while operating within the Class B, Class C, and Class D surface area unless the tower authorizes otherwise. Initial callup should be made about 15 miles from the airport. Unless there is a good reason to leave the tower frequency before exiting the Class B, Class C, and Class D surface areas, it is a good operating practice to remain on the tower frequency for the purpose of receiving traffic information. In the interest of reducing tower frequency congestion, pilots are reminded that it is not necessary to request permission to leave the tower frequency once outside of Class B, Class C, and Class D surface areas. Not all airports with an operating control tower will have Class D airspace. These airports do not have weather reporting which is a requirement for surface based controlled airspace, previously known as a control zone. The controlled airspace over these airports will normally begin at 700 feet or 1,200 feet above ground level and can be determined from the visual aeronautical charts. Pilots are expected to use good operating practices and communicate with the control tower as described in this section.

b. When necessary, the tower controller will issue clearances or other information for aircraft to generally follow the desired flight path (traffic patterns) when flying in Class B, Class C, and Class D surface areas and the proper taxi routes when operating on the ground. If not otherwise authorized or directed by the tower, pilots of fixed-wing aircraft approaching to land must circle the airport to the left. Pilots approaching to land in a helicopter must avoid the flow of fixed-wing traffic. However, in all instances, an appropriate clearance must be received from the tower before landing.

FIG 4-3-1

Components of a Traffic Pattern



NOTE-
This diagram is intended only to illustrate terminology used in identifying

various components of a traffic pattern. It should not be used as a reference or guide on how to enter a traffic pattern.

c. The following terminology for the various components of a traffic pattern has been adopted as standard for use by control towers and pilots (See FIG 4-3-1):

1. Upwind leg. A flight path parallel to the landing runway in the direction of landing.

2. Crosswind leg. A flight path at right angles to the landing runway off its takeoff end.

3. Downwind leg. A flight path parallel to the landing runway in the opposite direction of landing.

4. Base leg. A flight path at right angles to the landing runway off its approach end and extending from the downwind leg to the intersection of the extended runway centerline.

5. Final approach. A flight path in the direction of landing along the extended runway centerline from the base leg to the runway.

6. Departure leg. The flight path which begins after takeoff and continues straight ahead along the extended runway centerline. The departure climb continues until reaching a point at least $^1/_2$ mile beyond the departure end of the runway and within 300 feet of the traffic pattern altitude.

d. Many towers are equipped with a tower radar display. The radar uses are intended to enhance the effectiveness and efficiency of the local control, or tower, position. They are not intended to provide radar services or benefits to pilots except as they may accrue through a more efficient tower operation. The four basic uses are:

1. To determine an aircraft's exact location. This is accomplished by radar identifying the VFR aircraft through any of the techniques available to a radar position, such as having the aircraft *squawk ident*. Once identified, the aircraft's position and spatial relationship to other aircraft can be quickly determined, and standard instructions regarding VFR operation in Class B, Class C, and Class D surface areas will be issued. Once initial radar identification of a VFR aircraft has been established and the appropriate instructions have been issued, radar monitoring may be discontinued; the reason being that the local controller's primary means of surveillance in VFR conditions is visually scanning the airport and local area.

2. To provide radar traffic advisories. Radar traffic advisories may be provided to the extent that the local controller is able to monitor the radar display. Local control has primary control responsibilities to the aircraft operating on the runways, which will

normally supersede radar monitoring duties.

3. To provide a direction or suggested heading. The local controller may provide pilots flying VFR with generalized instructions which will facilitate operations; e.g., "PROCEED SOUTHWESTBOUND, ENTER A RIGHT DOWNWIND RUNWAY THREE ZERO," or provide a suggested heading to establish radar identification or as an advisory aid to navigation; e.g., "SUGGESTED HEADING TWO TWO ZERO, FOR RADAR IDENTIFICATION." In both cases, the instructions are advisory aids to the pilot flying VFR and are not radar vectors.

NOTE-
Pilots have complete discretion regarding acceptance of the suggested headings or directions and have sole responsibility for seeing and avoiding other aircraft.

4. To provide information and instructions to aircraft operating within Class B, Class C, and Class D surface areas. In an example of this situation, the local controller would use the radar to advise a pilot on an extended downwind when to turn base leg.

NOTE-
The above tower radar applications are intended to augment the standard functions of the local control position. There is no controller requirement to maintain constant radar identification. In fact, such a requirement could compromise the local controller's ability to visually scan the airport and local area to meet FAA responsibilities to the aircraft operating on the runways and within the Class B, Class C, and Class D surface areas. Normally, pilots will not be advised of being in radar contact since that continued status cannot be guaranteed and since the purpose of the radar identification is not to establish a link for the provision of radar services.

e. A few of the radar equipped towers are authorized to use the radar to ensure separation between aircraft in specific situations, while still others may function as limited radar approach controls. The various radar uses are strictly a function of FAA operational need. The facilities may be indistinguishable to pilots since they are all referred to as tower and no publication lists the degree of radar use. **Therefore, when in communication with a tower controller who may have radar available, do not assume that constant radar monitoring and complete ATC radar services are being provided.**

4-3-3. Traffic Patterns

At most airports and military air bases, traffic pattern altitudes for propeller-driven aircraft generally extend from 600 feet to as high as 1,500 feet above the ground. Also, traffic pattern altitudes for military turbojet aircraft sometimes extend up to 2,500 feet above the ground. Therefore, pilots of en route aircraft should be constantly on the alert for other

aircraft in traffic patterns and avoid these areas whenever possible. Traffic pattern altitudes should be maintained unless otherwise required by the applicable distance from cloud criteria (14 CFR Section 91.155). (See FIG 4-3-2 and FIG 4-3-3.)

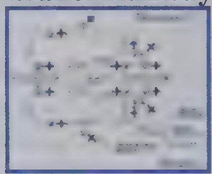
FIG 4-3-2

Traffic Pattern Operations
Single Runway

NOTE-
See Key to Traffic Pattern Operations under FIG 4-3-3.

FIG 4-3-3

Traffic Pattern Operations
Parallel Runways



EXAMPLE-
Key to traffic pattern operations

1. *Enter pattern in level flight, abeam the midpoint of the runway, at pattern altitude. (1,000' AGL is recommended pattern altitude unless established otherwise. . .)*

2. *Maintain pattern altitude until abeam approach end of the landing runway on downwind leg.*

3. *Complete turn to final at least $^1/_4$ mile from the runway.*

4. *Continue straight ahead until beyond departure end of runway.*

5. *If remaining in the traffic pattern, commence turn to crosswind leg beyond the departure end of the runway within 300 feet of pattern altitude.*

6. *If departing the traffic pattern, continue straight out, or exit with a 45 degree turn (to the left when in a left-hand traffic pattern; to the right when in a right-hand traffic pattern) beyond the departure*

end of the runway, after reaching pattern altitude.

7. *Do not overshoot final or continue on a track which will penetrate the final approach of the parallel runway.*

8. *Do not continue on a track which will penetrate the departure path of the parallel runway.*

4-3-4. Visual Indicators at Airports Without an Operating Control Tower

a. At those airports *without an operating control tower,* a segmented circle visual indicator system, if installed, is designed to provide traffic pattern information.

REFERENCE-
AIM, Traffic Advisory Practices at Airports Without Operating Control Towers, Paragraph 4-1-9.

b. The segmented circle system consists of the following components:

1. The segmented circle. Located in a position affording maximum visibility to pilots in the air and on the ground and providing a centralized location for other elements of the system.

2. The wind direction indicator. A wind cone, wind sock, or wind tee installed near the operational runway to indicate wind direction. The large end of the wind cone/wind sock points into the wind as does the large end (cross bar) of the wind tee. In lieu of a tetrahedron and where a wind sock or wind cone is collocated with a wind tee, the wind tee may be manually aligned with the runway in use to indicate landing direction. These signaling devices may be located in the center of the segmented circle and may be lighted for night use. Pilots are cautioned against using a tetrahedron to indicate wind direction.

3. The landing direction indicator. A tetrahedron is installed when conditions at the airport warrant its use. It may be used to indicate the direction of landings and takeoffs. A tetrahedron may be located at the center of a segmented circle and may be lighted for night operations. The small end of the tetrahedron points in the direction of landing. Pilots are cautioned against using a tetrahedron for any purpose other than as an indicator of landing direction. Further, pilots should use extreme caution when making runway selection by use of a tetrahedron in very light or calm wind conditions as the tetrahedron may not be aligned with the designated calm-wind runway. At airports with control towers, the tetrahedron should only be referenced when the control tower is not in operation. Tower instructions supersede tetrahedron indications.

4. Landing strip indicators. Installed in pairs as shown in the segmented circle diagram and used to show the alignment of landing strips.

5. Traffic pattern indicators. Arranged in pairs in conjunction with landing strip indicators and used to indicate the direction of turns when there is a variation from the normal left traffic pattern. (If there is no segmented circle installed at the airport, traffic pattern indicators may be installed on or near the end of the runway.)

c. Preparatory to landing at an airport without a control tower, or when the control tower is not in operation, pilots should concern themselves with the indicator for the approach end of the runway to be used. When approaching for landing, all turns must be made to the left unless a traffic pattern indicator indicates that turns should be made to the right. If the pilot will mentally enlarge the indicator for the runway to be used, the base and final approach legs of the traffic pattern to be flown immediately become apparent. Similar treatment of the indicator at the departure end of the runway will clearly indicate the direction of turn after takeoff.

d. When two or more aircraft are approaching an airport for the purpose of landing, the pilot of the aircraft at the lower altitude has the right-of-way over the pilot of the aircraft at the higher altitude. However, the pilot operating at the lower altitude should not take advantage of another aircraft, which is on final approach to land, by cutting in front of, or overtaking that aircraft.

4-3-5. Unexpected Maneuvers in the Airport Traffic Pattern

There have been several incidents in the vicinity of controlled airports that were caused primarily by aircraft executing unexpected maneuvers. ATC service is based upon observed or known traffic and airport conditions. Controllers establish the sequence of arriving and departing aircraft by requiring them to adjust flight as necessary to achieve proper spacing. These adjustments can only be based on observed traffic, accurate pilot reports, and anticipated aircraft maneuvers. Pilots are expected to cooperate so as to preclude disrupting traffic flows or creating conflicting patterns. The pilot-in-command of an aircraft is directly responsible for and is the final authority as to the operation of the aircraft. On occasion it may be necessary for pilots to maneuver their aircraft to maintain spacing with the traffic they have been sequenced to follow. The controller can anticipate minor maneuvering such as shallow "S" turns. The controller cannot, however, anticipate a major maneuver such as a 360 degree turn. If a pilot makes a 360 degree turn after obtaining a landing sequence, the result is usually a gap in the landing interval and, more importantly, it causes a chain reaction which may result in a conflict with following traffic and an interruption of the sequence established by the tower or approach controller. Should a pilot decide to make maneuvering turns to maintain spacing behind a preceding aircraft, the pilot should always advise the controller if at all possible. Except when requested by the controller or in emergency situations, a 360 degree turn should never be executed in the traffic pattern or when receiving radar service without first advising the controller.

4-3-6. Use of Runways/Declared Distances

a. Runways are identified by numbers which indicate the nearest 10-degree increment of the azimuth of the runway centerline. For example, where the magnetic azimuth is 183 degrees, the runway designation would be 18; for a magnetic azimuth of 87 degrees, the runway designation would be 9. For a magnetic azimuth ending in the number 5, such as 185, the runway designation

could be either 18 or 19. Wind direction issued by the tower is also magnetic and wind velocity is in knots.

b. Airport proprietors are responsible for taking the lead in local aviation noise control. Accordingly, they may propose specific noise abatement plans to the FAA. If approved, these plans are applied in the form of Formal or Informal Runway Use Programs for noise abatement purposes.

REFERENCE-
Pilot/Controller Glossary Term- Runway Use Program.

1. At airports where no runway use program is established, ATC clearances may specify:

(a) The runway most nearly aligned with the wind when it is 5 knots or more;

(b) The "calm wind" runway when wind is less than 5 knots; or

(c) Another runway if operationally advantageous.

NOTE-
It is not necessary for a controller to specifically inquire if the pilot will use a specific runway or to offer a choice of runways. If a pilot prefers to use a different runway from that specified or the one most nearly aligned with the wind, the pilot is expected to inform ATC accordingly.

2. At airports where a runway use program is established, ATC will assign runways deemed to have the least noise impact. If in the interest of safety a runway different from that specified is preferred, the pilot is expected to advise ATC accordingly. ATC will honor such requests and advise pilots when the requested runway is noise sensitive. When use of a runway other than the one assigned is requested, pilot cooperation is encouraged to preclude disruption of traffic flows or the creation of conflicting patterns.

c. At some airports, the airport proprietor may declare that sections of a runway at one or both ends are not available for landing or takeoff. For these airports, the declared distance of runway length available for a particular operation is published in the Airport/Facility Directory. Declared distances (*TORA, TODA, ASDA,* and *LDA*) are defined in the Pilot/Controller Glossary. These distances are calculated by adding to the full length of paved runway any applicable clearway or stopway and subtracting from that sum the sections of the runway unsuitable for satisfying the required takeoff run, takeoff, accelerate/stop, or landing distance.

4-3-7. Low Level Wind Shear Alert System (LLWAS) and Terminal Doppler Weather Radar (TDWR)

LLWAS and TDWR are systems designed to provide pilots with information on hazardous wind shear and microburst activity in the vicinity of an airport. Not all airports will have this capability, but more than half of the towered airports will have the capability to provide some level of alert.

a. At airports equipped with LLWAS, controllers are provided with gust front wind shear information. Controllers will provide this information to pilots by giving the pilot the airport wind followed by the boundary wind.

EXAMPLE-
Wind shear alert, airport wind 230 at 8, south boundary wind 170 at 20.

NOTE-
The LLWAS is designed to detect low level wind shear conditions around the periphery of an airport. It does not detect wind shear beyond that limitation.

b. Airports equipped with LLWAS "network expansion," LLWAS systems integrated with TDWR and TDWR systems provide the capability of detecting microburst alerts and wind shear alerts. Controllers will issue the appropriate wind shear alerts or microburst alerts. In some of these systems controllers also have the ability to issue wind information oriented to the threshold or departure end of the runway.

EXAMPLE-
Runway 17 arrival microburst alert, 40 knot loss 3 mile final.

REFERENCE-
AIM, Microbursts, Paragraph 7-1-24.

c. An airport equipped with the LLWAS is so indicated in the Airport/Facility Directory under Weather Data Sources for that particular airport.

4-3-8. Braking Action Reports and Advisories

a. When available, ATC furnishes pilots the quality of braking action received from pilots or airport management. The quality of braking action is described by the terms "good," "fair," "poor," and "nil," or a combination of these terms. When pilots report the quality of braking action by using the terms noted above, they should use descriptive terms that are easily understood, such as, "braking action poor the first/last half of the runway," together with the particular type of aircraft.

b. For NOTAM purposes, braking action reports are classified according to the most critical term ("fair," "poor," or "nil") used and issued as a NOTAM(D).

c. When tower controllers have received runway braking action reports which include the terms *poor* or *nil,* or whenever weather conditions are conducive to deteriorating or rapidly changing runway braking conditions, the tower will include on the ATIS broadcast the statement, *"BRAKING ACTION ADVISORIES ARE IN EFFECT."*

d. During the time that braking action advisories are in effect, ATC will issue

the latest braking action report for the runway in use to each arriving and departing aircraft. Pilots should be prepared for deteriorating braking conditions and should request current runway condition information if not volunteered by controllers. Pilots should also be prepared to provide a descriptive runway condition report to controllers after landing.

4-3-9. Runway Friction Reports and Advisories

a. Friction is defined as the ratio of the tangential force needed to maintain uniform relative motion between two contacting surfaces (aircraft tires to the pavement surface) to the perpendicular force holding them in contact (distributed aircraft weight to the aircraft tire area). Simply stated, friction quantifies slipperiness of pavement surfaces.

b. The greek letter MU (pronounced "myew"), is used to designate a friction value representing runway surface conditions.

c. MU (friction) values range from 0 to 100 where zero is the lowest friction value and 100 is the maximum friction value obtainable. For frozen contaminants on runway surfaces, a MU value of 40 or less is the level when the aircraft braking performance starts to deteriorate and directional control begins to be less responsive. The lower the MU value, the less effective braking performance becomes and the more difficult directional control becomes.

d. At airports with friction measuring devices, airport management should conduct friction measurements on runways covered with compacted snow and/or ice.

1. Numerical readings may be obtained by using any FAA approved friction measuring device. As these devices do not provide equal numerical readings on contaminated surfaces, it is necessary to designate the type of friction measuring device used.

2. When the MU value for any one-third zone of an active runway is 40 or less, a report should be given to ATC by airport management for dissemination to pilots. The report will identify the runway, the time of measurement, the type of friction measuring device used, MU values for each zone, and the contaminant conditions, e.g., wet snow, dry snow, slush, deicing chemicals, etc. Measurements for each one-third zone will be given in the direction of takeoff and landing on the runway. A report should also be given when MU values rise above 40 in all zones of a runway previously reporting a MU below 40.

3. Airport management should initiate a NOTAM(D) when the friction measuring device is out of service.

e. When MU reports are provided by airport management, the ATC facility providing approach control or local airport advisory will provide the report to any pilot upon request.

f. Pilots should use MU information with other knowledge including aircraft performance characteristics, type, and weight, previous experience, wind conditions, and aircraft tire type (i.e., bias ply vs. radial constructed) to determine runway suitability.

g. No correlation has been established between MU values and the descriptive terms "good," "fair," "poor," and "nil" used in braking action reports.

4-3-10. Intersection Takeoffs

a. In order to enhance airport capacities, reduce taxiing distances, minimize departure delays, and provide for more efficient movement of air traffic, controllers may initiate intersection takeoffs as well as approve them when the pilot requests. If for ANY reason a pilot prefers to use a different intersection or the full length of the runway or desires to obtain the distance between the intersection and the runway end, THE PILOT IS EXPECTED TO INFORM ATC ACCORDINGLY.

b. An aircraft is expected to taxi to (but not onto) the end of the assigned runway unless prior approval for an intersection departure is received from ground control.

c. Pilots should state their position on the airport when calling the tower for takeoff from a runway intersection.

EXAMPLE-
Cleveland Tower, Apache Three Seven Two Two Papa, at the intersection of taxiway Oscar and runway two three right, ready for departure.

d. Controllers are required to separate small aircraft (12,500 pounds or less, maximum certificated takeoff weight) departing (same or opposite direction) from an intersection behind a large nonheavy aircraft on the same runway, by ensuring that at least a 3-minute interval exists between the time the preceding large aircraft has taken off and the succeeding small aircraft begins takeoff roll. To inform the pilot of the required 3-minute hold, the controller will state, "Hold for wake turbulence." If after considering wake turbulence hazards, the pilot feels that a lesser time interval is appropriate, the pilot may request a waiver to the 3-minute interval. To initiate such a request, simply say "Request waiver to 3-minute interval," or a similar statement. Controllers may then issue a takeoff clearance if other traffic permits, since the pilot has accepted the responsibility for wake turbulence separation.

e. The 3-minute interval is not required when the intersection is 500 feet or less from the departure point of the preceding aircraft and both aircraft are taking off in the same direction. Controllers may permit the small aircraft to alter course after takeoff to avoid the flight path of the preceding departure.

f. The 3-minute interval is mandatory behind a heavy aircraft in all cases.

4-3-11. Pilot Responsibilities When Conducting Land and Hold Short Operations (LAHSO)

a. LAHSO is an acronym for "Land and Hold Short Operations." These operations include landing and holding short of an **intersecting runway**, an **intersecting taxiway**, or some other designated **point on a runway** other than an intersecting runway or taxiway. (See FIG 4-3-4, FIG 4-3-5, FIG 4-3-6.)

b. Pilot Responsibilities and Basic Procedures.

1. LAHSO is an air traffic control procedure that requires pilot participation to balance the needs for increased airport capacity and system efficiency, consistent with safety. This procedure can be done safely **provided** pilots and controllers are knowledgeable and understand their responsibilities. The following paragraphs outline specific pilot/operator responsibilities when conducting LAHSO.

2. At controlled airports, air traffic may clear a pilot to land and hold short. Pilots may accept such a clearance provided that the pilot-in-command determines that the aircraft can safely land and stop within the Available Landing Distance (ALD). ALD data are published in the special notices section of the Airport/Facility Directory (A/FD) and in the U.S. Terminal Procedures Publications. Controllers will also provide ALD data upon request. Student pilots or pilots not familiar with LAHSO should **not** participate in the program.

3. The pilot-in-command has the final authority to accept or decline any land and hold short clearance. The safety and operation of the aircraft remain the responsibility of the pilot. Pilots are expected to decline a LAHSO clearance if they determine it will compromise safety.

4. To conduct LAHSO, pilots should become familiar with all available information concerning LAHSO at their destination airport. Pilots should have, *readily available,* the **published ALD** and runway **slope information** for **all** LAHSO runway combinations at **each** airport of intended landing. Additionally, knowledge about landing performance data permits the pilot to *readily* determine that the ALD for the assigned runway is sufficient for safe LAHSO. As part of a pilot's preflight planning process, pilots should determine if their destination airport has LAHSO. If so, their preflight planning process should include an assessment of which LAHSO combinations would work for them given their aircraft's required landing distance. Good pilot decision making is knowing in advance whether one can accept a LAHSO clearance if offered.

FIG 4-3-4

Land and Hold Short of an Intersecting Runway

EXAMPLE-
FIG 4-3-6 - holding short at a designated point may be required to avoid conflicts with the runway safety area/flight path of a nearby runway.

NOTE-
Each figure shows the approximate location of LAHSO markings, signage, and in-pavement lighting when installed.

REFERENCE-
AIM, Chapter 2, Aeronautical Lighting and Other Airport Visual Aids.

FIG 4-3-5

Land and Hold Short of an Intersecting Taxiway

FIG 4-3-6

Land and Hold Short of a Designated Point on a Runway Other Than an Intersecting Runway or Taxiway

5. If, for any reason, such as difficulty in discerning the location of a LAHSO intersection, wind conditions, aircraft condition, etc., the pilot elects to request to land on the full length of the runway, to land on another runway, or to decline LAHSO, a pilot is expected to promptly inform air traffic, ideally even before the clearance is issued. **A LAHSO clearance, once accepted, must be adhered to, just as any other ATC clearance, unless an amended clearance is obtained or an emergency occurs. A LAHSO clearance does not preclude a rejected landing.**

6. A pilot who accepts a LAHSO clearance should land and exit the runway at the first convenient taxiway (unless directed otherwise) before reaching the hold short point. Otherwise, the

pilot must stop and hold at the hold short point. **If a rejected landing becomes necessary after accepting a LAHSO clearance, the pilot should maintain safe separation from other aircraft or vehicles, and should promptly notify the controller.**

7. Controllers need a full read back of all LAHSO clearances. Pilots should read back their LAHSO clearance and include the words, "HOLD SHORT OF (RUNWAY/TAXIWAY/OR POINT)" in their acknowledgment of **all** LAHSO clearances. In order to reduce frequency congestion, pilots are encouraged to read back the LAHSO clearance without prompting. Don't make the controller have to ask for a read back!

c. LAHSO Situational Awareness

1. Situational awareness is **vital** to the success of LAHSO. Situational awareness starts with having current airport information in the cockpit, readily accessible to the pilot. (An airport diagram assists pilots in identifying their location on the airport, thus reducing requests for "progressive taxi instructions" from controllers.)

2. Situational awareness includes effective pilot-controller radio communication. ATC expects pilots to specifically acknowledge and read back all LAHSO clearances as follows:

EXAMPLE-
ATC: *"(Aircraft ID) cleared to land runway six right, hold short of taxiway bravo for crossing traffic (type aircraft)."*
Aircraft: *"(Aircraft ID), wilco, cleared to land runway six right to hold short of taxiway bravo."*
ATC: *"(Aircraft ID) cross runway six right at taxiway bravo, landing aircraft will hold short."*
Aircraft: *"(Aircraft ID), wilco, cross runway six right at bravo, landing traffic (type aircraft) to hold."*

3. For those airplanes flown with two crewmembers, effective **intra-cockpit** communication between cockpit crewmembers is also critical. There have been several instances where the pilot working the radios accepted a LAHSO clearance but then simply forgot to tell the pilot flying the aircraft.

4. Situational awareness also includes a thorough understanding of the airport markings, signage, and lighting associated with LAHSO. These visual aids consist of a three-part system of **yellow hold-short markings, red and white signage** and, in certain cases, **in-pavement lighting**. Visual aids assist the pilot in determining where to hold short. FIG 4-3-4, FIG 4-3-5, FIG 4-3-6 depict how these markings, signage, and lighting combinations will appear once installed. Pilots are cautioned that not all airports conducting LAHSO have installed any or all of the above

markings, signage, or lighting.

5. Pilots should only receive a LAHSO clearance when there is a minimum ceiling of 1,000 feet and 3 statute miles visibility. The intent of having "basic" VFR weather conditions is to allow pilots to maintain visual contact with other aircraft and ground vehicle operations. Pilots should consider the effects of prevailing inflight visibility (such as landing into the sun) and how it may affect overall situational awareness. Additionally, surface vehicles and aircraft being taxied by maintenance personnel may also be participating in LAHSO, especially in those operations that involve crossing an active runway.

4-3-12. Low Approach

a. A low approach (sometimes referred to as a low pass) is the go-around maneuver following an approach. Instead of landing or making a touch-and- go, a pilot may wish to go around (low approach) in order to expedite a particular operation (a series of practice instrument approaches is an example of such an operation). Unless otherwise authorized by ATC, the low approach should be made straight ahead, with no turns or climb made until the pilot has made a thorough visual check for other aircraft in the area.

b. When operating within a Class B, Class C, and Class D surface area, a pilot intending to make a low approach should contact the tower for approval. This request should be made prior to starting the final approach.

c. When operating to an airport, not within a Class B, Class C, and Class D surface area, a pilot intending to make a low approach should, prior to leaving the final approach fix inbound (nonprecision approach) or the outer marker or fix used in lieu of the outer marker inbound (precision approach), so advise the FSS, UNICOM, or make a broadcast as appropriate.

REFERENCE-
AIM, Traffic Advisory Practices at Airports Without Operating Control Towers, Paragraph 4-1-9.

4-3-13. Traffic Control Light Signals

a. The following procedures are used by ATCT's in the control of aircraft, ground vehicles, equipment, and personnel not equipped with radio. These same procedures will be used to control aircraft, ground vehicles, equipment, and personnel equipped with radio if radio contact cannot be established. ATC personnel use a directive traffic control signal which emits an intense narrow light beam of a selected color (either red, white, or green) when controlling traffic by light signals.

b. Although the traffic signal light offers the advantage that some control may be exercised over nonradio equipped aircraft, pilots should be cognizant of the disadvantages which are:

1. Pilots may not be looking at the control tower at the time a signal is directed toward their aircraft.

2. The directions transmitted by a light signal are very limited since only approval or disapproval of a pilot's anticipated actions may be transmitted. No supplement or explanatory information may be transmitted except by the use of the "General Warning Signal" which advises the pilot to be on the alert.

c. Between sunset and sunrise, a pilot wishing to attract the attention of the control tower should turn on a landing light and taxi the aircraft into a position, clear of the active runway, so that light is visible to the tower. The landing light should remain on until appropriate signals are received from the tower.

d. Air Traffic Control Tower Light Gun Signals. (See TBL 4-3-1.)

TBL 4-3-1

	Meaning		
Color and Type of Signal	**Movement of Vehicles, Equipment and Personnel**	**Aircraft on the Ground**	**Aircraft in Flight**
Steady green	Cleared to cross, proceed or go	Cleared for takeoff	Cleared to land
Flashing green	Not applicable	Cleared for taxi	Return for landing (to be followed by steady green at the proper time)
Steady red	STOP	STOP	Give way to other aircraft and continue circling
Flashing red	Clear the taxiway/runway	Taxi clear of the runway in use	Airport unsafe, do not land
Flashing white	Return to starting point on airport	Return to starting point on airport	Not applicable
Alternating red and green	Exercise extreme caution	Exercise extreme caution	Exercise extreme caution

e. During daylight hours, acknowledge tower transmissions or light signals by moving the ailerons or rudder. At night, acknowledge by blinking the landing or navigation lights. If radio malfunction occurs after departing the parking area, watch the tower for light signals or monitor tower frequency.

4-3-14. Communications

a. Pilots of departing aircraft should communicate with the control tower on the appropriate ground control/clearance delivery frequency prior to starting engines to receive engine start time, taxi and/or clearance information. Unless otherwise advised by the tower, remain on that frequency during taxiing and runup, then change to local control frequency when ready to request takeoff clearance.

NOTE-
Pilots are encouraged to monitor the local tower frequency as soon as practical

consistent with other ATC requirements.

REFERENCE-
AIM, Automatic Terminal Information Service (ATIS), Paragraph 4-1-13.

b. The majority of ground control frequencies are in the 121.6-121.9 MHz bandwidth. Ground control frequencies are provided to eliminate frequency congestion on the tower (local control) frequency and are limited to communications between the tower and aircraft on the ground and between the tower and utility vehicles on the airport, provide a clear VHF channel for arriving and departing aircraft. They are used for issuance of taxi information, clearances, and other necessary contacts between the tower and aircraft or other vehicles operated on the airport. A pilot who has just landed should not change from the tower frequency to the ground control frequency until directed to do so by the controller. Normally, only one ground control frequency is assigned at an airport; however, at locations where the amount of traffic so warrants, a second ground control frequency and/or another frequency designated as a clearance delivery frequency, may be assigned.

c. A controller may omit the ground or local control frequency if the controller believes the pilot knows which frequency is in use. If the ground control frequency is in the 121 MHz bandwidth the controller may omit the numbers preceding the decimal point; e.g., 121.7, "CONTACT GROUND POINT SEVEN." However, if any doubt exists as to what frequency is in use, the pilot should promptly request the controller to provide that information.

d. Controllers will normally avoid issuing a radio frequency change to helicopters, known to be single-piloted, which are hovering, air taxiing, or flying near the ground. At times, it may be necessary for pilots to alert ATC regarding single pilot operations to minimize delay of essential ATC communications. Whenever possible, ATC instructions will be relayed through the frequency being monitored until a frequency change can be accomplished. You must promptly advise ATC if you are unable to comply with a frequency change. Also, you should advise ATC if you must land to accomplish the frequency change unless it is clear the landing will have no impact on other air traffic; e.g., on a taxiway or in a helicopter operating area.

4-3-15. Gate Holding Due to Departure Delays

a. Pilots should contact ground control or clearance delivery prior to starting engines as gate hold procedures will be in effect whenever departure delays exceed or are anticipated to exceed 15 minutes. The sequence for departure will be maintained in accordance with initial call up unless modified by flow control restrictions. Pilots should monitor the ground control or clearance delivery frequency for engine startup advisories or new proposed start time if the delay changes.

b. The tower controller will consider that pilots of turbine-powered aircraft are ready for takeoff when they reach the runway or warm-up block unless advised otherwise.

4-3-16. VFR Flights in Terminal Areas

Use reasonable restraint in exercising the prerogative of VFR flight, especially in terminal areas. The weather minimums and distances from clouds are minimums. Giving yourself a greater margin in specific instances is just good judgment.

a. Approach Area. Conducting a VFR operation in a Class B, Class C, Class D, and Class E surface area when the official visibility is 3 or 4 miles is not prohibited, but good judgment would dictate that you keep out of the approach area.

b. Reduced Visibility. It has always been recognized that precipitation reduces forward visibility. Consequently, although again it may be perfectly legal to cancel your IFR flight plan at any time you can proceed VFR, it is good practice, when precipitation is occurring, to continue IFR operation into a terminal area until you are reasonably close to your destination.

c. Simulated Instrument Flights. In conducting simulated instrument flights, be sure that the weather is good enough to compensate for the restricted visibility of the safety pilot and your greater concentration on your flight instruments. Give yourself a little greater margin when your flight plan lies in or near a busy airway or close to an airport.

4-3-17. VFR Helicopter Operations at Controlled Airports

a. General.

1. The following ATC procedures and phraseologies recognize the unique capabilities of helicopters and were developed to improve service to all users. Helicopter design characteristics and user needs often require operations from movement areas and nonmovement areas within the airport boundary. In order for ATC to properly apply these procedures, it is essential that pilots familiarize themselves with the local operations and make it known to controllers when additional instructions are necessary.

2. Insofar as possible, helicopter operations will be instructed to avoid the flow of fixed-wing aircraft to minimize overall delays; however, there will be many situations where faster/larger helicopters may be integrated with fixed-wing aircraft for the benefit of all concerned. Examples would include IFR flights, avoidance of noise sensitive areas, or use of runways/taxiways to minimize the hazardous effects of rotor downwash in congested areas.

3. Because helicopter pilots are intimately familiar with the effects of rotor downwash, they are best qualified to determine if a given operation can be conducted safely. Accordingly, the pilot has the final authority with respect to the specific airspeed/altitude combinations. ATC clearances are in no way intended to place the helicopter in a hazardous position. It is expected that pilots will advise ATC if a specific clearance will cause undue hazards to persons or property.

b. Controllers normally limit ATC ground service and instruction to *movement* areas; therefore, operations from *nonmovement* areas are conducted at pilot discretion and should be based on local policies, procedures, or letters of agreement. In order to maximize the flexibility of helicopter operations, it is necessary to rely heavily on sound pilot judgment. For example, hazards such as debris, obstructions, vehicles, or personnel must be recognized by the pilot, and action should be taken as necessary to avoid such hazards. Taxi, hover taxi, and air taxi operations are considered to be ground movements. Helicopters conducting such operations are expected to adhere to the same conditions, requirements, and practices as apply to other ground taxiing and ATC procedures in the AIM.

1. The phraseology *taxi* is used when it is intended or expected that the helicopter will taxi on the airport surface, either via taxiways or other prescribed routes. *Taxi* is used primarily for helicopters equipped with wheels or in response to a pilot request. Preference should be given to this procedure whenever it is necessary to minimize effects of rotor downwash.

2. Pilots may request a *hover taxi* when slow forward movement is desired or when it may be appropriate to move very short distances. Pilots should avoid this procedure if rotor downwash is likely to cause damage to parked aircraft or if blowing dust/snow could obscure visibility. If it is necessary to operate above 25 feet AGL when hover taxiing, the pilot should initiate a request to ATC.

3. *Air taxi* is the preferred method for helicopter ground movements on airports provided ground operations and conditions permit. Unless otherwise requested or instructed, pilots are expected to remain below 100 feet AGL. However, if a higher than normal airspeed or altitude is desired, the request should be made prior to lift-off. The pilot is solely responsible for selecting a safe airspeed for the altitude/operation being conducted. Use of *air taxi* enables the pilot to proceed at an optimum airspeed/altitude, minimize downwash effect, conserve fuel, and expedite movement from one point to another. Helicopters should avoid overflight of other aircraft, vehicles, and personnel during air-taxi operations. Caution must be exercised concerning active runways and pilots must be certain that air taxi instructions are understood. Special precautions may be necessary at unfamiliar airports or airports with multiple/intersecting active runways. The taxi procedures given in paragraph 4-3-18, Taxiing, paragraph 4-3-19, Taxi During Low Visibility, and paragraph 4-3-20, Exiting the Runway After Landing, also apply.

REFERENCE-
Pilot/Controller Glossary Term- Taxi.
Pilot/Controller Glossary Term- Hover Taxi.
Pilot/Controller Glossary Term- Air Taxi.

c. Takeoff and Landing Procedures.

1. Helicopter operations may be conducted from a runway, taxiway, portion of a landing strip, or any clear area which could be used as a landing site such as the scene of an accident, a construction site, or the roof of a building. The terms used to describe designated areas from which helicopters operate are: movement area, landing/takeoff area, apron/ramp, heliport and helipad (See Pilot/Controller Glossary). These areas may be improved or unimproved and may be separate from or located on an airport/heliport. ATC will issue takeoff clearances from *movement* areas other than active runways, or in diverse directions from active runways, with additional instructions as necessary. Whenever possible, takeoff clearance will be issued in lieu of extended hover/air taxi operations. Phraseology will be "CLEARED FOR TAKEOFF FROM (taxiway, helipad, runway number, etc.), MAKE RIGHT/LEFT TURN FOR (direction, heading, NAVAID radial) DEPARTURE/DEPARTURE ROUTE (number, name, etc.)." Unless requested by the pilot, downwind takeoffs will not be issued if the tailwind exceeds 5 knots.

2. Pilots should be alert to wind information as well as to wind indications in the vicinity of the helicopter. ATC should be advised of the intended method of departing. A pilot request to takeoff in a given direction indicates that the pilot is willing to accept the wind condition and controllers will honor the request if traffic permits. Departure points could be a significant distance from the control tower and it may be difficult or impossible for the controller to determine the helicopter's relative position to the wind.

3. If takeoff is requested from *nonmovement* areas, the phraseology "PROCEED AS REQUESTED" will be used. Additional instructions will be issued as necessary. The pilot is responsible for operating in a safe manner and should exercise due caution. When other known traffic is not a factor and takeoff is requested from an area not visible from the tower, an area not authorized for helicopter use, an unlighted area at night, or an area not on the airport, the phraseology "DEPARTURE FROM (location) WILL BE AT YOUR OWN RISK (with reason, and additional instructions as necessary)."

4. Similar phraseology is used for helicopter landing operations. Every effort will be made to permit helicopters to proceed direct and land as near as possible to their final destination on the airport. Traffic density, the need for detailed taxiing instructions, frequency congestion, or other factors may affect the extent to which service can be expedited. As with ground movement operations, a high degree of pilot/controller cooperation and communication is necessary to achieve safe and efficient operations.

4-3-18. Taxiing

a. General. Approval must be obtained prior to moving an aircraft or vehicle onto the movement area during the hours an Airport Traffic Control Tower is in

operation.

1. Always state your position on the airport when calling the tower for taxi instructions.

2. The movement area is normally described in local bulletins issued by the airport manager or control tower. These bulletins may be found in FSS's, fixed base operators offices, air carrier offices, and operations offices.

3. The control tower also issues bulletins describing areas where they cannot provide ATC service due to nonvisibility or other reasons.

4. A clearance must be obtained prior to taxiing on a runway, taking off, or landing during the hours an Airport Traffic Control Tower is in operation.

5. When ATC clears an aircraft to "taxi to" an assigned takeoff runway, the absence of holding instructions authorizes the aircraft to "cross" all runways which the taxi route intersects except the assigned takeoff runway. It does not include authorization to "taxi onto" or "cross" the assigned takeoff runway at any point. In order to preclude misunderstandings in radio communications, ATC will not use the word "cleared" in conjunction with authorization for aircraft to taxi.

6. In the absence of holding instructions, a clearance to "taxi to" any point other than an assigned takeoff runway is a clearance to cross all runways that intersect the taxi route to that point.

7. Air traffic control will first specify the runway, issue taxi instructions, and then state any required hold short instructions, when authorizing an aircraft to taxi for departure. This does not authorize the aircraft to "enter" or "cross" the assigned departure runway at any point.

NOTE-
Air traffic controllers are required to obtain from the pilot a readback of all runway hold short instructions.

8. If a pilot is expected to hold short of a runway approach ("APPCH") area or ILS holding position (see FIG 2-3-15, Taxiways Located in Runway Approach Area), ATC will issue instructions.

9. Pilots should always read back the runway assignment and runway hold short instructions when taxi instructions are received from the controller. Controllers are required to request a readback of runway hold short assignment when it is not received from the pilot/vehicle.

b. ATC clearances or instructions pertaining to taxiing are predicated on known traffic and known physical airport conditions. Therefore, it is important that pilots clearly understand the clearance or instruction. Although an ATC clearance is issued for taxiing purposes, when operating in accordance with the CFR's, it is the responsibility of the pilot to avoid collision with other aircraft. Since "the pilot-in-command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft" the pilot should obtain clarification of any clearance or instruction which is not understood.

REFERENCE-
AIM, General, Paragraph 7-3-1.

1. Good operating practice dictates that pilots acknowledge all runway crossing, hold short, or takeoff clearances unless there is some misunderstanding, at which time the pilot should query the controller until the clearance is understood.

NOTE-
Air traffic controllers are required to obtain from the pilot a readback of all runway hold short instructions.

2. Pilots operating a single pilot aircraft should monitor only assigned ATC communications after being cleared onto the active runway for departure. Single pilot aircraft should not monitor other than ATC communications until flight from Class B, Class C, or Class D surface area is completed. This same procedure should be practiced from after receipt of the clearance for landing until the landing and taxi activities are complete. Proper effective scanning for other aircraft, surface vehicles, or other objects should be continuously exercised in all cases.

3. If the pilot is unfamiliar with the airport or for any reason confusion exists as to the correct taxi routing, a request may be made for progressive taxi instructions which include step-by-step routing directions. Progressive instructions may also be issued if the controller deems it necessary due to traffic or field conditions; i.e., construction or closed taxiways.

c. At those airports where the U.S. Government operates the control tower and ATC has authorized noncompliance with the requirement for two-way radio communications while operating within the Class B, Class C, or Class D surface area, or at those airports where the U.S. Government does not operate the control tower and radio communications cannot be established, pilots shall obtain a clearance by visual light signal prior to taxiing on a runway and prior to takeoff and landing.

d. The following phraseologies and procedures are used in radiotelephone communications with aeronautical ground stations.

1. Request for taxi instructions prior to departure. State your aircraft identification, location, type of operation planned (VFR or IFR), and the point of first intended landing.

EXAMPLE-
Aircraft: *"Washington ground, Beechcraft One Three One Five Niner at hangar eight, ready to taxi, I-F-R to Chicago."*

Tower: *"Beechcraft One Three One Five Niner, Washington ground, taxi to runway three six, wind zero three zero at two five, altimeter three zero zero four."*

or

Tower: *"Beechcraft one three one five niner, Washington ground, runway two seven, taxi via taxiways Charlie and Delta, hold short of runway three three left."*

Aircraft: *"Beechcraft One Three One Five Niner, hold short of runway three three left."*

2. Receipt of ATC clearance. ARTCC clearances are relayed to pilots by airport traffic controllers in the following manner.

EXAMPLE-
Tower: *"Beechcraft One Three One Five Niner, cleared to the Chicago Midway Airport via Victor Eight, maintain eight thousand."*

Aircraft: *"Beechcraft One Three One Five Niner, cleared to the Chicago Midway Airport via Victor Eight, maintain eight thousand."*

NOTE-
Normally, an ATC IFR clearance is relayed to a pilot by the ground controller. At busy locations, however, pilots may be instructed by the ground controller to "contact clearance delivery" on a frequency designated for this purpose. No surveillance or control over the movement of traffic is exercised by this position of operation.

3. Request for taxi instructions after landing. State your aircraft identification, location, and that you request taxi instructions.

EXAMPLE-
Aircraft: *"Dulles ground, Beechcraft One Four Two Six One clearing runway one right on taxiway echo three, request clearance to Page."*

Tower: *"Beechcraft One Four Two Six One, Dulles ground, taxi to Page via taxiways echo three, echo one, and echo niner."*

or

Aircraft: *"Orlando ground, Beechcraft One Four Two Six One clearing runway one eight left at taxiway bravo three, request*

clearance to Page."

***Tower:** "Beechcraft One Four Two Six One, Orlando ground, hold short of runway one eight right."*

***Aircraft:** "Beechcraft One Four Two Six One, hold short of runway one eight right."*

4-3-19. Taxi During Low Visibility

a. Pilots and aircraft operators should be constantly aware that during certain low visibility conditions the movement of aircraft and vehicles on airports may not be visible to the tower controller. This may prevent visual confirmation of an aircraft's adherence to taxi instructions.

b. Of vital importance is the need for pilots to notify the controller when difficulties are encountered or at the first indication of becoming disoriented. Pilots should proceed with extreme caution when taxiing toward the sun. When vision difficulties are encountered pilots should immediately inform the controller.

c. Advisory Circular 120-57, Surface Movement Guidance and Control System, commonly known as SMGCS (pronounced "SMIGS") requires a low visibility taxi plan for any airport which has takeoff or landing operations in less than 1,200 feet runway visual range (RVR) visibility conditions. These plans, which affect aircrew and vehicle operators, may incorporate additional lighting, markings, and procedures to control airport surface traffic. They will be addressed at two levels; operations less than 1,200 feet RVR to 600 feet RVR and operations less than 600 feet RVR.

NOTE-
Specific lighting systems and surface markings may be found in paragraph 2-1-9, Taxiway Lights, and paragraph 2-3-4, Taxiway Markings.

d. When low visibility conditions exist, pilots should focus their entire attention on the safe operation of the aircraft while it is moving. Checklists and nonessential communication should be withheld until the aircraft is stopped and the brakes set.

4-3-20. Exiting the Runway After Landing

The following procedures should be followed after landing and reaching taxi speed.

a. Exit the runway without delay at the first available taxiway or on a taxiway as instructed by ATC. Pilots shall not exit the landing runway onto another runway unless authorized by ATC. At airports with an operating control tower, pilots should not stop or reverse course on the runway without first obtaining ATC approval.

b. Taxi clear of the runway unless otherwise directed by ATC. In the absence of ATC instructions the pilot is expected to taxi clear of the landing runway by

clearing the hold position marking associated with the landing runway even if that requires the aircraft to protrude into or cross another taxiway or ramp area. This does not authorize an aircraft to cross a subsequent taxiway/runway/ramp after clearing the landing runway.

NOTE-
The tower will issue the pilot with instructions which will normally permit the aircraft to enter another taxiway, runway, or ramp area when required to taxi clear of the runway by clearing the hold position marking associated with the landing runway.

c. Stop the aircraft after clearing the runway if instructions have not been received from ATC.

d. Immediately change to ground control frequency when advised by the tower and obtain a taxi clearance.

NOTE-
1. *The tower will issue instructions required to resolve any potential conflictions with other ground traffic prior to advising the pilot to contact ground control.*

2. *A clearance from ATC to taxi to the ramp authorizes the aircraft to cross all runways and taxiway intersections. Pilots not familiar with the taxi route should request specific taxi instructions from ATC.*

4-3-21. Practice Instrument Approaches

a. Various air traffic incidents have indicated the necessity for adoption of measures to achieve more organized and controlled operations where practice instrument approaches are conducted. Practice instrument approaches are considered to be instrument approaches made by either a VFR aircraft not on an IFR flight plan or an aircraft on an IFR flight plan. To achieve this and thereby enhance air safety, it is Air Traffic's policy to provide for separation of such operations at locations where approach control facilities are located and, as resources permit, at certain other locations served by ARTCC's or parent approach control facilities. Pilot requests to practice instrument approaches may be approved by ATC subject to traffic and workload conditions. Pilots should anticipate that in some instances the controller may find it necessary to deny approval or withdraw previous approval when traffic conditions warrant. It must be clearly understood, however, that even though the controller may be providing separation, pilots on VFR flight plans are required to comply with basic VFR weather minimums (14 CFR Section 91.155). Application of ATC procedures or any action taken by the controller to avoid traffic conflictions does not relieve IFR and VFR pilots of their responsibility to see-and-avoid other traffic while operating in VFR conditions (14 CFR Section 91.113). In addition to the normal IFR separation minimums (which includes visual separation) during VFR conditions, 500 feet vertical separation may be applied between VFR aircraft and between a VFR aircraft and the IFR aircraft. Pilots not on IFR flight plans desiring practice instrument approaches should always state `practice' when making requests to ATC. Controllers will instruct VFR aircraft requesting an instrument approach to maintain VFR. This is to preclude

misunderstandings between the pilot and controller as to the status of the aircraft. If pilots wish to proceed in accordance with instrument flight rules, they must specifically request and obtain, an IFR clearance.

b. Before practicing an instrument approach, pilots should inform the approach control facility or the tower of the type of practice approach they desire to make and how they intend to terminate it, i.e., full-stop landing, touch-and-go, or missed or low approach maneuver. This information may be furnished progressively when conducting a series of approaches. Pilots on an IFR flight plan, who have made a series of instrument approaches to full stop landings should inform ATC when they make their final landing. The controller will control flights practicing instrument approaches so as to ensure that they do not disrupt the flow of arriving and departing itinerant IFR or VFR aircraft. The priority afforded itinerant aircraft over practice instrument approaches is not intended to be so rigidly applied that it causes grossly inefficient application of services. A minimum delay to itinerant traffic may be appropriate to allow an aircraft practicing an approach to complete that approach.

NOTE-
A clearance to land means that appropriate separation on the landing runway will be ensured. A landing clearance does not relieve the pilot from compliance with any previously issued restriction.

c. At airports without a tower, pilots wishing to make practice instrument approaches should notify the facility having control jurisdiction of the desired approach as indicated on the approach chart. All approach control facilities and ARTCC's are required to publish a Letter to Airmen depicting those airports where they provide standard separation to both VFR and IFR aircraft conducting practice instrument approaches.

d. The controller will provide approved separation between both VFR and IFR aircraft when authorization is granted to make practice approaches to airports where an approach control facility is located and to certain other airports served by approach control or an ARTCC. Controller responsibility for separation of VFR aircraft begins at the point where the approach clearance becomes effective, or when the aircraft enters Class B or Class C airspace, or a TRSA, whichever comes first.

e. VFR aircraft practicing instrument approaches are not automatically authorized to execute the missed approach procedure. This authorization must be specifically requested by the pilot and approved by the controller. Separation will not be provided unless the missed approach has been approved by ATC.

f. Except in an emergency, aircraft cleared to practice instrument approaches must not deviate from the approved procedure until cleared to do so by the controller.

g. At radar approach control locations when a full approach procedure (procedure turn, etc.,) cannot be approved, pilots should expect to be vectored to a final approach course for a practice instrument approach which is compatible with the general direction of traffic at that airport.

h. When granting approval for a practice instrument approach, the controller will usually ask the pilot to report to the tower prior to or over the final approach fix inbound (nonprecision approaches) or over the outer marker or fix used in lieu of the outer marker inbound (precision approaches).

i. When authorization is granted to conduct practice instrument approaches to an airport with a tower, but where approved standard separation is not provided to aircraft conducting practice instrument approaches, the tower will approve the practice approach, instruct the aircraft to maintain VFR and issue traffic information, as required.

j. When an aircraft notifies a FSS providing Local Airport Advisory to the airport concerned of the intent to conduct a practice instrument approach and whether or not separation is to be provided, the pilot will be instructed to contact the appropriate facility on a specified frequency prior to initiating the approach. At airports where separation is not provided, the FSS will acknowledge the message and issue known traffic information but will neither approve or disapprove the approach.

k. Pilots conducting practice instrument approaches should be particularly alert for other aircraft operating in the local traffic pattern or in proximity to the airport.

4-3-22. Option Approach

The "Cleared for the Option" procedure will permit an instructor, flight examiner or pilot the option to make a touch-and-go, low approach, missed approach, stop-and-go, or full stop landing. This procedure can be very beneficial in a training situation in that neither the student pilot nor examinee would know what maneuver would be accomplished. The pilot should make a request for this procedure passing the final approach fix inbound on an instrument approach or entering downwind for a VFR traffic pattern. The advantages of this procedure as a training aid are that it enables an instructor or examiner to obtain the reaction of a trainee or examinee under changing conditions, the pilot would not have to discontinue an approach in the middle of the procedure due to student error or pilot proficiency requirements, and finally it allows more flexibility and economy in training programs. This procedure will only be used at those locations with an operational control tower and will be subject to ATC approval.

4-3-23. Use of Aircraft Lights

a. Aircraft position lights are required to be lighted on aircraft operated on the surface and in flight from sunset to sunrise. In addition, aircraft equipped with an anti-collision light system are required to be operated during all types of operations (day and night) except when the pilot-in-command determines that the anti-collision lights should be turned off when their light output during adverse meteorological conditions would constitute a hazard to safety (14 CFR Section 91.209). Supplementary strobe lights should be turned off on the ground when they adversely affect ground personnel or other pilots, and in flight when there are adverse reflection from clouds.

b. An aircraft anti-collision light system can use one or more rotating beacons

and/or strobe lights, be colored either red or white, and have different (higher than minimum) intensities when compared to other aircraft. Many aircraft have both a rotating beacon and a strobe light system.

c. The FAA has a voluntary pilot safety program, Operation Lights On, to enhance the *see-and-avoid* concept. Pilots are encouraged to turn on their landing lights during takeoff; i.e., either after takeoff clearance has been received or when beginning takeoff roll. Pilots are further encouraged to turn on their landing lights when operating below 10,000 feet, day or night, especially when operating within 10 miles of any airport, or in conditions of reduced visibility and in areas where flocks of birds may be expected, i.e., coastal areas, lake areas, around refuse dumps, etc. Although turning on aircraft lights does enhance the *see-and-avoid* concept, pilots should not become complacent about keeping a sharp lookout for other aircraft. Not all aircraft are equipped with lights and some pilots may not have their lights turned on. Aircraft manufacturer's recommendations for operation of landing lights and electrical systems should be observed.

d. Prop and jet blast forces generated by large aircraft have overturned or damaged several smaller aircraft taxiing behind them. To avoid similar results, and in the interest of preventing upsets and injuries to ground personnel from such forces, the FAA recommends that air carriers and commercial operators turn on their rotating beacons anytime their aircraft engines are in operation. General aviation pilots using rotating beacon equipped aircraft are also encouraged to participate in this program which is designed to alert others to the potential hazard. Since this is a voluntary program, exercise caution and do not rely solely on the rotating beacon as an indication that aircraft engines are in operation.

e. At the discretion of the pilot-in-command turn on all external illumination, including landing lights, when taxiing on, across, or holding in position on any runway. This increases the conspicuity of the aircraft to controllers and other pilots approaching to land, taxiing, or crossing the runway. Pilots should comply with any equipment operating limitations and consider the effects of landing and strobe lights on other aircraft in their vicinity. When cleared for takeoff pilots should turn on any remaining exterior lights.

4-3-24. Flight Inspection/'Flight Check' Aircraft in Terminal Areas

a. *Flight check* is a call sign used to alert pilots and air traffic controllers when a FAA aircraft is engaged in flight inspection/certification of NAVAID's and flight procedures. Flight check aircraft fly preplanned high/low altitude flight patterns such as grids, orbits, DME arcs, and tracks, including low passes along the full length of the runway to verify NAVAID performance. In most instances, these flight checks are being automatically recorded and/or flown in an automated mode.

b. Pilots should be especially watchful and avoid the flight paths of any aircraft using the call sign "Flight Check" or "Flight Check Recorded." The latter call sign; e.g. "Flight Check 47 Recorded" indicates that automated flight inspections are in progress in terminal areas. These flights will normally receive special handling from ATC. Pilot patience and cooperation in allowing

uninterrupted recordings can significantly help expedite flight inspections, minimize costly, repetitive runs, and reduce the burden on the U.S. taxpayer.

4-3-25. Hand Signals

FIG 4-3-7

Signalman Directs Towing

FIG 4-3-8

Signalman's Position

FIG 4-3-9

All Clear
(O.K.)

FIG 4-3-10

Start Engine

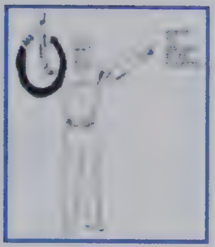


FIG 4-3-11

Pull Chocks

FIG 4-3-12

Proceed Straight Ahead

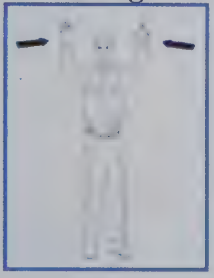


FIG 4-3-13

Left Turn

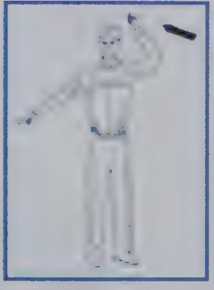


FIG 4-3-14

Right Turn

FIG 4-3-15

Slow Down

FIG 4-3-16

Flagman Directs Pilot

FIG 4-3-17

Insert Chocks

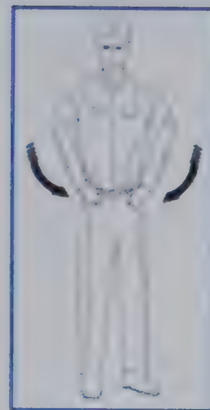


FIG 4-3-18

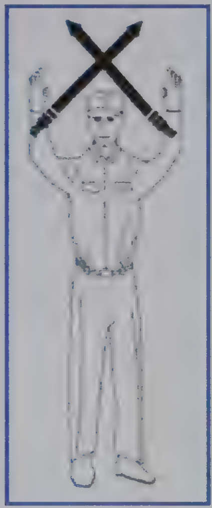
Cut Engines

FIG 4-3-19

Night Operation

FIG 4-3-20

Stop



4-3-26. Operations at Uncontrolled Airports With Automated Surface Observing System (ASOS)/Automated Weather Observing System (AWOS)

a. Many airports throughout the National Airspace System are equipped with either ASOS or AWOS. At most airports with an operating control tower or human observer, the weather will be available to you in an Aviation Routine Weather Report (METAR) hourly or special observation format on the Automatic Terminal Information Service (ATIS) or directly transmitted from the controller/observer.

b. At uncontrolled airports that are equipped with ASOS/AWOS with ground-to-air broadcast capability, the one-minute updated airport weather should be available to you within approximately 25 NM of the airport below 10,000 feet. The frequency for the weather broadcast will be published on sectional charts and in the Airport/Facility Directory. Some part-time towered airports may also broadcast the automated weather on their ATIS frequency during the hours that the tower is closed.

c. Controllers issue SVFR or IFR clearances based on pilot request, known traffic and reported weather, i.e., METAR/Nonroutine (Special) Aviation Weather Report (SPECI) observations, when they are available. Pilots have access to more current weather at uncontrolled ASOS/AWOS airports than do the controllers who may be located several miles away. Controllers will rely on the pilot to determine the current airport weather from the ASOS/AWOS. All aircraft arriving or departing an ASOS/AWOS equipped uncontrolled airport should monitor the airport weather frequency to ascertain the status of the airspace. Pilots in Class E airspace must be alert for changing weather conditions which may effect the status of the airspace from IFR/VFR. If ATC service is required for IFR/SVFR approach/departure or requested for VFR service, the pilot should advise the controller that he/she has received the one-minute weather and state his/her intentions.

EXAMPLE-
"I have the (airport) one-minute weather, request an ILS Runway 14 approach."

Air Traffic Control

I INTRODUCTION

Air Traffic Control, various aircraft navigation and communication systems that use computers, radar, radios, and other instruments and devices to provide guidance to flying aircraft. Trained personnel working as *air traffic controllers* at stations on the ground constantly monitor these systems and track the locations and speeds of individual aircraft. Controllers can warn aircraft should they come too close to each other. Air traffic control is also used for the safe coordination of landings and takeoffs at airports.

P. Alix/Woodfin Camp and Associates, Inc.

Paris Airport

The control tower at an airport in Paris, France, stands over airplanes waiting at the terminals. Air traffic controllers use radar, computers, and radio to track air traffic and issue instructions for takeoffs and landings. Airport operations include a variety of jobs necessary to assure smooth and safe transportation.

The goal of air traffic control is to minimize the risk of aircraft collisions while maximizing the number of aircraft that can fly safely at the same time. Aircraft pilots and their onboard flight crews work closely with controllers to manage air traffic. Air traffic control systems also provide updated weather information to airports around the country, so aircraft can take off and land safely. This information is important not only to airline passengers but also to industries that rely on aviation for the timely transport of goods, materials, and personnel.

II ELEMENTS OF AIR TRAFFIC CONTROL

Air traffic control is a combination of three general elements. The first element is the basic set of flying rules that pilots follow in the air. These are much like the traffic rules that motorists must obey. The second element is the multitude of electronic navigation systems and instruments that pilots use to remain on course. The third element is made up of air traffic controllers and the computer systems they use to track aircraft during takeoff, flight, and landing. These three elements work together to keep aircraft safely separated in the air and to avoid collisions.

A Flight Rules

The basic system of air traffic control relies on the ability of pilots to provide their own navigation in order to see and visually avoid other aircraft. This system is known as Visual Flight Rules (VFR). Under VFR pilots navigate using charts that display terrain features, airports, and landmarks. VFR pilots also may use radio beacons or other ground-based navigational aids to monitor their flight path. To avoid other aircraft, pilots fly at specified altitudes reserved for their general direction of flight. Pilots also simply keep a constant lookout for other aircraft. VFR works well where visibility is good, aircraft speeds are fairly low, and air traffic is sparse. VFR pilots must remain clear of clouds and have a range of visibility of at least 5 km (3 mi).

When any of the VFR conditions cannot be met, or if a pilot is operating in a busy area, aircraft must be operated under Instrument Flight Rules (IFR). IFR is a more complex set of rules, and pilots flying under IFR must have an instrument pilot certificate. IFR requires that pilots notify the airport control tower of their intended route before takeoff, a procedure known as filing a flight plan. Once the tower gives clearance, the pilot may take off. The pilot must also maintain radio contact with air traffic controllers during the flight. IFR is required whenever flight visibility is less than 5 km (3 mi), when pilots must fly through clouds, or when pilots are flying in congested areas. Airlines and larger aircraft normally operate under IFR at all times. In the United States, the Federal Aviation Administration (FAA) is the federal agency that regulates air travel. The FAA requires that all aircraft use IFR when flying near major metropolitan areas or at the high altitudes normally used by commercial airliners.

The flight crew of an aircraft, made up of the pilot and any other personnel that fly or navigate the aircraft, use various instruments when flying under IFR. These instruments are designed to work in any weather condition, day or night, and tell the pilot the direction and speed of the aircraft. The altimeter indicates altitude, and the airspeed indicator shows how fast the aircraft is moving. The attitude indicator shows how the aircraft is tilted in flight. Other instruments indicate direction.

The flight crew also uses radio to stay in contact with air traffic controllers. Flight crews file flight plans with the control tower by radio, and ask for clearance before taking off or landing at an airport. Another communications instrument used by aircraft is an automatic device called a transponder. A transponder sends an electronic identification signal to air traffic control centers on the ground. Controllers use transponder signals to identify individual aircraft and track their positions by computer.

B Navigation Systems

Charles Thatcher/Tony Stone Images

VOR Station

VOR (very-high-frequency omnidirectional range) stations are radio antennas on the ground that broadcast navigation signals in all directions to aircraft. By using a special receiver, a pilot can determine his or her aircraft's direction of travel relative to a VOR station. Pilots navigate from station to station along corridors known as airways.

Navigation systems assist pilots in flying from one airport to another. These systems help both pilots and air traffic controllers determine an aircraft's position relative to the ground and to other aircraft. At high altitudes, or during bad weather, navigation systems are essential for safe aircraft flight. Navigation systems have developed from fairly inaccurate ground-based radio transmitters to sophisticated space-based systems.

The earliest navigational aids were simple radio beacons, in use since 1924. Radio beacons provided the pilot with only the ability to head toward the beacon. Although fairly inaccurate, beacons were inexpensive to install and were at one time fairly numerous. Advances in navigation technology led the FAA to decommission many of these navigation aids.

The basic electronic navigation system in use is the VHF omnidirectional range (VOR) system. VOR consists of a series of radio stations that beam direction information to aircraft. Most VOR stations also have distance-measuring equipment (DME). A display indicator in the aircraft reads the signals and tells the pilots if they are on course and how far they are from the station. VOR-DME systems are limited in range to 260 km (160 mi) and can only provide direct courses to or from a given station. This limitation compelled the FAA to install thousands of ground stations across the United States and to provide over 8,000 airway segments connecting each VOR-DME station to another.

Researchers have been working since the 1950s to increase the flexibility of the VOR system. Area navigation systems have been developed that permit a pilot to fly directly from one airport to another, bypassing the VOR airways. Loran (*lo*ng *ran*ge navigation) is a radio system that automatically calculates an aircraft's position and provides direct navigation guidance to any location. However, the charged particles in the layer of the atmosphere known as the ionosphere limit the radio range of Loran signals and can sometimes cause

interference.

Flight Navigation System (VOR)

An omnirange station broadcasts radio beams that pilots within a radius of 160 km (100 mi) may use for navigation. The VOR (Very High Frequency Omnidirectional Range) station uses a central antenna to broadcast a continuous reference signal and four variable-signal antennas that produce a signal rotated at 1,800 rpm. A pilot sets a desired course manually, then relies on electronic equipment to interpret and process the signals received from the VOR station. The airplane receiver compares the phases of the signals to determine the bearing of the plane, then indicates whether the plane is to the left or right of the desired course.

Satellites provide a better system of area navigation than ground-based radio stations. In the 1980s the U.S. Department of Defense developed a highly accurate satellite-based navigation system known as the Global Positioning System, or GPS. GPS and other satellite navigation systems provide highly accurate positioning information to anyone using an appropriate receiver.

GPS-type systems are so accurate that the FAA and its international counterpart, the International Civil Aviation Organization (ICAO), have agreed that satellite navigation will become the standard for international aviation navigation. Satellite navigation provides adequate accuracy for in-flight navigation, but will need to be improved if it is to guide aircraft during the more complex landing procedure. Two systems have been developed and are planned for installation by the FAA. One system, called the Wide Area Augmentation System (WAAS), uses a satellite transmitter to send accuracy corrections to all aircraft operating over the continental United States. The other, the Local Area Augmentation System (LAAS), will be installed at airports to provide guidance information that will allow automated aircraft landings in any type of weather.

One type of instrument navigation that does not rely on radio or satellite transmissions is inertial guidance. Inertial guidance uses mechanical or laser gyroscopes to determine precisely an aircraft's direction of flight. When an inertial guidance system has been programmed correctly, it can provide direction to any point in the world. Although inertial guidance is fairly costly, its biggest advantage is that it is a self-contained system, independent of either ground or space-based transmitters.

The navigation instruments that pilots use to land aircraft during foul weather are more sensitive than those used to navigate during flight. The systems mentioned above only guide aircraft to within 2 km (1 mi) of the end of an airport runway. To guide aircraft to a safe landing, many runways have been equipped with the Instrument Landing System (ILS). The ILS uses two transmitters to guide aircraft to within 800 m (0.5 mi) of the runway. One transmitter provides altitude information as the aircraft approaches the runway, and the other transmitter alerts the pilot if the aircraft drifts to the left or right of the runway path. More sophisticated versions of the ILS guide aircraft to within 400 meters (0.25 mi) of the runway, or to the runway itself for an automatic landing. The combination of the satellite-based WAAS and LAAS is planned to replace ILS and should provide approaches to the major runways in the United States.

C Air Traffic Controllers

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Air Traffic Control

Using radar and radio communication, air traffic controllers monitor and guide all airplanes in the vicinity of their airports. This involves directing airplanes in the process of taking off or landing, as well as ensuring that airplanes fly at their assigned altitudes and headings, preventing mid-air collisions.

Air traffic controllers make up the third segment of air traffic control, managing the location of aircraft to ensure the safest and most efficient use of airspace. Controllers use radar and transponder signals to monitor aircraft positions and altitudes within a given area of airspace. Controllers also track hazardous weather and obstructions to flight, and relay this information to flight crews. Air traffic controllers work in one of three different types of stations. Air Route Traffic Control Centers (ARTCC) are located nationwide and track all air traffic within their airspace. Flight Service Stations provide weather information to pilots, and are also located nationwide. Control towers are located at airports, and coordinate aircraft landings and takeoffs.

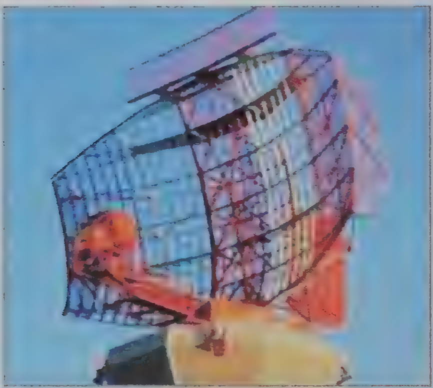
The ARTCCs are responsible for the separation of IFR aircraft as they fly between airports. ARTCC controllers also guide IFR aircraft operating from small airports that do not have control towers. There are 22 ARTCCs in the United States, each employing hundreds of controllers. Each ARTCC is centered around a huge room that

houses radio and computer equipment and between 50 and 100 radar displays. Each display is assigned to an individual sector, or area of airspace, within radio range of the ARTCC. Each sector is monitored by as many as four controllers at a time. The controllers include a radar controller, a radar associate (who acts as an assistant), a flight data controller (who performs much of the routine computer entries), and a coordinator (who communicates information to surrounding sectors). ARTCCs also employ traffic management controllers, who monitor overall traffic flow and make any traffic adjustments needed to reduce aircraft delays.

The FAA also operates 95 flight service stations. These stations provide weather briefings and pass along weather and flight planning information to pilots. They also record flight plans from pilots, provide in-flight assistance to VFR aircraft, and coordinate search and rescue operations. Many flight service stations are automated.

Airport control towers coordinate landings and takeoffs, and are probably the air traffic control facilities most visible to the public. The first towers were small glassed-in rooms built on top of airport terminal buildings. Modern towers are hundreds of feet high, with room for a dozen controllers to work at one time. The local controller has responsibility for ensuring that the runways are clear before permitting landings and takeoffs. The ground controller is responsible for aircraft taxiing to and from runways. Clearance delivery controllers issue IFR clearances to pilots, while flight data controllers operate the computer equipment. The busiest towers also employ traffic management controllers to help coordinate traffic flows. Major metropolitan airports also use radar to guide aircraft safely in and out of the busy airspace around the airport. These radar facilities, known as TRACONs, perform many of the functions of an ARTCC, but within the airspace surrounding an airport.

III HOW AIR TRAFFIC CONTROL WORKS



Science Source/Photo Researchers, Inc.

Radar Dish

Radar dishes, such as this one at London's Heathrow airport, enable air-traffic controllers to safely and efficiently direct airplanes in flight. The shape of the dish is designed to focus radar waves into a beam that scatters off aircraft. The part of the beam that gets reflected is detected by the radar dish and gives important information about the airplane, such as its altitude, heading, and speed.

Before departure, IFR pilots file a flight plan and contact the clearance delivery controller to receive their clearance to fly. A clearance includes the route and flight altitude, the frequencies for radio and transponder use, and departure instructions. At airports with a control tower, both IFR and VFR pilots contact the ground controller to receive taxi instructions, which tell the pilot which runway to use, and when to proceed. When

ready for departure, the pilot contacts the local controller. When the local controller is confident that the runway and all intersections are clear of traffic, the airplane is cleared for takeoff. Once airborne, IFR pilots contact the departure controller to receive heading and altitude instructions, guiding the airplane to the appropriate airway. VFR pilots usually navigate visually to their destination airport.

In most cases, airliners and business aircraft file IFR flight plans and use the ATC system during their entire flight, even if the weather is suitable for visual navigation. This is a safety requirement of both the FAA and the airlines, since these flights occur at high speed and in congested areas. Small, privately owned aircraft usually operate under VFR once they have left the immediate vicinity of the airport. Since VFR pilots operate at low altitudes where airliners do not typically fly, and at much slower speeds, it is easier for them to see and avoid other aircraft. If they operate exclusively from small airports, they may never need to contact a controller at all. But once within the vicinity of a large airport, they are required to make contact with a controller so that separation of all aircraft can be provided.

Air traffic controllers watch radar displays that show the locations of individual aircraft. These displays also predict future positions and altitudes of aircraft. If the computer detects that two aircraft might come too close to each other or that one aircraft might descend to an inappropriately low altitude, it will sound an alert and the controller will tell the pilots to change course. A similar computer system installed in most airliners is called the traffic alert/collision avoidance system, or TCAS. TCAS independently monitors the positions of nearby aircraft and determines whether a potential for collision exists. If TCAS predicts a potential problem, it alerts the pilots automatically and issues course and altitude changes to avoid a collision.

Once an aircraft has flown 50 km (30 mi) from the airport, the departure controller transfers, or hands off, the tracking signal to a succession of ARTCC controllers. ARTCC controllers monitor the aircraft's progress, separate it from other aircraft, and issue route or speed changes when needed to avoid bad weather or to keep the aircraft in the proper flow of traffic. As an aircraft flies out of range and toward another ARTCC, the tracking controller hands off the signal to a controller at the next ARTCC, who monitors the aircraft as it continues on its journey.

Once the aircraft is close to its destination, the controller issues arrival instructions to the pilot, and then hands the aircraft off to the approach controller at the airport. VFR pilots usually contact approach control 50 km (30 mi) from the destination airport. Approach control is responsible for lining inbound aircraft up for the runway. Once aircraft are properly spaced, local control takes over and issues landing instructions. If there is a delay in landing, an aerial traffic jam can develop. To avoid this, aircraft waiting to land are directed to a holding area away from the runway. At the holding area the waiting aircraft circle a radio beacon at different altitudes, forming a stack of aircraft. When a runway becomes available, an airplane at the bottom of the stack is instructed to land, and the waiting aircraft spiral down one layer. After the aircraft has landed and taxied off the runway, ground control issues taxi instructions that direct the aircraft to parking.

IV ADMINISTRATION AND MANAGEMENT

Air traffic control in the United States is organized and regulated by the FAA. The FAA provides substantial air traffic control coverage to the airspace in the United States. Other countries provide their own air traffic control systems, which can differ widely in technology and sophistication. The FAA and other air traffic control agencies are planning to modernize air traffic control systems with satellite tracking. New satellite systems will improve safety by enhancing the tracking ability of air traffic controllers.

A Organization

The FAA has overall responsibility for air traffic control in the United States. Airspace in the United States is divided into a number of flight information regions, each under the control of one ARTCC. Some airspace is reserved for military use, while the remaining airspace is broken into smaller, more manageable areas called sectors. Sectors are designed around traffic flows and usually control either low- or high-altitude aircraft. A team of controllers manages the traffic in each sector. Airspace surrounding busier airports is delegated to either air traffic control towers or terminal radar approach controls.

B Stations and Personnel

The FAA operates over 32,500 different air navigation and air traffic control systems. These facilities include 90 flight service stations, over 350 control towers, 190 radar approach controls, and 22 air route traffic control facilities. The FAA also operates and maintains research and development facilities, a major training academy, and numerous regulatory offices. The air traffic control system is responsible for the separation of over 200,000 takeoffs and landings every day. This totals over 73 million per year. The busiest airports in the United States in 1998 were Dallas-Fort Worth (with almost 782,000 flight operations), Chicago O'Hare, Atlanta Hartsfield, and Los Angeles International Airport.

Almost 20,000 air traffic controllers are employed in the United States. Most controllers work for the FAA, which is an agency of the federal Department of Transportation. Additional controllers are employed by private organizations and usually work at smaller airports. Controller salaries are based on experience and the complexity of the facility.

Controllers must complete a set of screening examinations and training courses to become certified. Selected individuals are employed by the FAA and sent to its training facility in Oklahoma City, Oklahoma, for a 15-week training program. New controllers complete between one and three years of on-the-job training before working by themselves.

C Labor and the FAA

The FAA has a long history of labor relations problems. Until the late 1960s, most FAA employees were former military controllers. When aviation began to grow, the FAA began to hire employees with little or no aviation background, and conflict between the former military employees and the new civilian staff eventually arose.

In the 1960s air traffic controllers voted to create a union called the Professional Air Traffic Controllers Organization (PATCO). PATCO immediately made funding and staffing demands on the FAA. When these demands were not met, controllers protested in 1970 by not showing up for work. Although the protest lasted only a couple of days, it proved to be a warm-up for what was to come. Still dissatisfied with the FAA, PATCO sponsored an illegal controllers strike in 1981. The leaders of PATCO felt that public sympathy would force the government to meet many of their demands. The administration of President Ronald Reagan felt that this challenge to its authority must be met and that most of the controllers would abandon their union. The FAA gave the controllers two days to return to work or be fired. Both groups miscalculated. Few controllers returned to work, and over 11,000 of the 15,000 controllers were subsequently fired. The FAA then began a

massive training program that was completed around the year 1990. Most air traffic controllers fired during the strike left the profession, although a few gained employment at private air traffic control facilities. The FAA rehired some former employees in the late 1990s, after the administration of President Bill Clinton lifted Reagan's ban on reemployment. Although most of the new controllers were thought to be unsympathetic to unionization, in the 1990s they raised many of the same concerns as PATCO, and formed a new union, the National Air Traffic Controllers Association (NATCA).

D Improving Air Traffic Control

There is a fairly standardized system of air traffic control worldwide. Through membership in the International Civil Aviation Organization (IACO), almost every nation has agreed to provide air traffic control services to aircraft operating within its borders. ICAO standards include the use of English as the common language and the use of VOR and satellite systems as the primary navigation tools. Every nation that is a member of the ICAO is required to provide service to any civil aircraft overflying its borders. Some countries offer this service for free, while others charge for their services. Air traffic control procedures in other countries can vary from very sophisticated to almost nonexistent. Countries whose standard of living is similar to that in the United States usually operate modern air traffic control systems. Countries lacking in financial resources often operate less sophisticated systems.

Many different approaches to improving the efficiency of air traffic control have been considered. In some countries, the government contracts with private companies to operate segments of the air traffic control system. In other countries, the entire system is operated as a private or public corporation. In the United States, the FAA currently contracts out the operation of many smaller air traffic control towers. Air traffic control systems in other countries, such as Canada and New Zealand, currently operate as private corporations.

The FAA is embarking on a major project to modernize the air traffic control system. The FAA plans for communications, navigation, and air traffic surveillance to be handled by satellite. Sophisticated computers will help the controllers manage the flow of air traffic. Pilots will be able to select their own routes and altitudes and will be able to modify them at will. The new system will monitor each aircraft and will alert the pilot and controller to any possible conflicts. The pilot and controller will then work together to determine a solution. This method of air traffic control is known as free flight, and is planned to become the standard in the United States by the year 2010.

See also Airplane; Aviation.

Contributed By:
Michael S. Nolan

Chapter 1. Navigation Aids

Section 1. Air Navigation Aids

1-1-1. General

a. Various types of air navigation aids are in use today, each serving a special purpose. These aids have varied owners and operators, namely: the Federal Aviation Administration (FAA), the military services, private organizations, individual states and foreign governments. The FAA has the statutory authority to establish, operate, maintain air navigation facilities and to prescribe standards for the operation of any of these aids which are used for instrument flight in federally controlled airspace. These aids are tabulated in the Airport/Facility Directory (A/FD).

b. Pilots should be aware of the possibility of momentary erroneous indications on cockpit displays when the primary signal generator for a ground-based navigational transmitter (for example, a glideslope, VOR, or nondirectional beacon) is inoperative. Pilots should disregard any navigation indication, regardless of its apparent validity, if the particular transmitter was identified by NOTAM or otherwise as unusable or inoperative.

1-1-2. Nondirectional Radio Beacon (NDB)

a. A low or medium frequency radio beacon transmits nondirectional signals whereby the pilot of an aircraft properly equipped can determine bearings and "home" on the station. These facilities normally operate in the frequency band of 190 to 535 kilohertz (kHz) and transmit a continuous carrier with either 400 or 1020 hertz (Hz) modulation. All radio beacons except the compass locators transmit a continuous three-letter identification in code except during voice transmissions.

b. When a radio beacon is used in conjunction with the Instrument Landing System markers, it is called a Compass Locator.

c. Voice transmissions are made on radio beacons unless the letter "W" (without voice) is included in the class designator (HW).

d. Radio beacons are subject to disturbances that may result in erroneous bearing information. Such disturbances result from such factors as lightning, precipitation static, etc. At night, radio beacons are vulnerable to interference from distant stations. Nearly all disturbances which affect the Automatic Direction Finder (ADF) bearing also affect the facility's identification. Noisy identification usually occurs when the ADF needle is erratic. Voice, music or erroneous identification may be heard when a steady false bearing is being displayed. Since ADF receivers do not have a "flag" to warn the pilot when erroneous bearing information is being displayed, the pilot should continuously monitor the NDB's identification.

1-1-3. VHF Omni-directional Range (VOR)

a. VOR's operate within the 108.0 to 117.95 MHz frequency band and have a power

output necessary to provide coverage within their assigned operational service volume. They are subject to line-of-sight restrictions, and the range varies proportionally to the altitude of the receiving equipment.

NOTE-
Normal service ranges for the various classes of VOR's are given in Navigational Aid (NAVAID) Service Volumes, paragraph 1-1-8.

b. Most VOR's are equipped for voice transmission on the VOR frequency. VOR's without voice capability are indicated by the letter "W" (without voice) included in the class designator (VORW).

c. The only positive method of identifying a VOR is by its Morse Code identification or by the recorded automatic voice identification which is always indicated by use of the word "VOR" following the range's name. Reliance on determining the identification of an omnirange should never be placed on listening to voice transmissions by the Flight Service Station (FSS) (or approach control facility) involved. Many FSS's remotely operate several omniranges with different names. In some cases, none of the VOR's have the name of the "parent" FSS. During periods of maintenance, the facility may radiate a T-E-S-T code (- •••• -) or the code may be removed.

d. Voice identification has been added to numerous VOR's. The transmission consists of a voice announcement, "AIRVILLE VOR" alternating with the usual Morse Code identification.

e. The effectiveness of the VOR depends upon proper use and adjustment of both ground and airborne equipment.

1. Accuracy. The accuracy of course alignment of the VOR is excellent, being generally plus or minus 1 degree.

2. Roughness. On some VOR's, minor course roughness may be observed, evidenced by course needle or brief flag alarm activity (some receivers are more susceptible to these irregularities than others). At a few stations, usually in mountainous terrain, the pilot may occasionally observe a brief course needle oscillation, similar to the indication of "approaching station." Pilots flying over unfamiliar routes are cautioned to be on the alert for these vagaries, and in particular, to use the "to/from" indicator to determine positive station passage.

(a) Certain propeller revolutions per minute (RPM) settings or helicopter rotor speeds can cause the VOR Course Deviation Indicator to fluctuate as much as plus or minus six degrees. Slight changes to the RPM setting will normally smooth out this roughness. Pilots are urged to check for this modulation phenomenon prior to reporting a VOR station or aircraft equipment for unsatisfactory operation.

1-1-4. VOR Receiver Check

a. The FAA VOR test facility (VOT) transmits a test signal which provides users a convenient means to determine the operational status and accuracy of a VOR receiver while on the ground where a VOT is located. The airborne use of VOT is permitted; however, its use is strictly limited to those areas/altitudes specifically authorized in the A/FD or appropriate supplement.

b. To use the VOT service, tune in the VOT frequency on your VOR receiver. With the Course Deviation Indicator (CDI) centered, the omni-bearing selector should read 0 degrees with the to/from indication showing "from" or the omni-bearing selector should read 180 degrees with the to/from indication showing "to." Should the VOR receiver operate an RMI (Radio Magnetic Indicator), it will indicate 180 degrees on any omni-bearing selector (OBS) setting. Two means of identification are used. One is a series of dots and the other is a continuous tone. Information concerning an individual test signal can be obtained from the local FSS.

c. Periodic VOR receiver calibration is most important. If a receiver's Automatic Gain Control or modulation circuit deteriorates, it is possible for it to display acceptable accuracy and sensitivity close into the VOR or VOT and display out-of-tolerance readings when located at greater distances where weaker signal areas exist. The likelihood of this deterioration varies between receivers, and is generally considered a function of time. The best assurance of having an accurate receiver is periodic calibration. Yearly intervals are recommended at which time an authorized repair facility should recalibrate the receiver to the manufacturer's specifications.

d. Federal Aviation Regulations (14 CFR Section 91.171) provides for certain VOR equipment accuracy checks prior to flight under instrument flight rules. To comply with this requirement and to ensure satisfactory operation of the airborne system, the FAA has provided pilots with the following means of checking VOR receiver accuracy:

> **1.** VOT or a radiated test signal from an appropriately rated radio repair station.
>
> **2.** Certified airborne check points.
>
> **3.** Certified check points on the airport surface.

e. A radiated VOT from an appropriately rated radio repair station serves the same purpose as an FAA VOR signal and the check is made in much the same manner as a VOT with the following differences:

> **1.** The frequency normally approved by the Federal Communications Commission is 108.0 MHz.
>
> **2.** Repair stations are not permitted to radiate the VOR test signal continuously; consequently, the owner or operator must make arrangements with the repair station to have the test signal transmitted. This service is not provided by all radio repair stations. The aircraft owner or operator must determine which repair station in the local area provides this service. A representative of the repair station must make an entry into the aircraft logbook or other permanent record certifying to the

radial accuracy and the date of transmission. The owner, operator or representative of the repair station may accomplish the necessary checks in the aircraft and make a logbook entry stating the results. It is necessary to verify which test radial is being transmitted and whether you should get a "to" or "from" indication.

f. Airborne and ground check points consist of certified radials that should be received at specific points on the airport surface or over specific landmarks while airborne in the immediate vicinity of the airport.

1. Should an error in excess of plus or minus 4 degrees be indicated through use of a ground check, or plus or minus 6 degrees using the airborne check, Instrument Flight Rules (IFR) flight shall not be attempted without first correcting the source of the error.

CAUTION-
No correction other than the correction card figures supplied by the manufacturer should be applied in making these VOR receiver checks.

2. Locations of airborne check points, ground check points and VOT's are published in the A/FD and are depicted on the A/G voice communications panels on the FAA IFR area chart and IFR enroute low altitude chart.

3. If a dual system VOR (units independent of each other except for the antenna) is installed in the aircraft, one system may be checked against the other. Turn both systems to the same VOR ground facility and note the indicated bearing to that station. The maximum permissible variations between the two indicated bearings is 4 degrees.

1-1-5. Tactical Air Navigation (TACAN)

a. For reasons peculiar to military or naval operations (unusual siting conditions, the pitching and rolling of a naval vessel, etc.) the civil VOR/Distance Measuring Equipment (DME) system of air navigation was considered unsuitable for military or naval use. A new navigational system, TACAN, was therefore developed by the military and naval forces to more readily lend itself to military and naval requirements. As a result, the FAA has been in the process of integrating TACAN facilities with the civil VOR/DME program. Although the theoretical, or technical principles of operation of TACAN equipment are quite different from those of VOR/DME facilities, the end result, as far as the navigating pilot is concerned, is the same. These integrated facilities are called VORTAC's.

b. TACAN ground equipment consists of either a fixed or mobile transmitting unit. The airborne unit in conjunction with the ground unit reduces the transmitted signal to a visual presentation of both azimuth and distance information. TACAN is a pulse system and operates in the Ultrahigh Frequency (UHF) band of frequencies. Its use requires TACAN airborne equipment and does not operate through conventional VOR equipment.

1-1-6. VHF Omni-directional Range/Tactical Air Navigation (VORTAC)

a. A VORTAC is a facility consisting of two components, VOR and TACAN, which provides three individual services: VOR azimuth, TACAN azimuth and TACAN distance (DME) at one site. Although consisting of more than one component, incorporating more than one operating frequency, and using more than one antenna system, a VORTAC is considered to be a unified navigational aid. Both components of a VORTAC are envisioned as operating simultaneously and providing the three services at all times.

b. Transmitted signals of VOR and TACAN are each identified by three-letter code transmission and are interlocked so that pilots using VOR azimuth with TACAN distance can be assured that both signals being received are definitely from the same ground station. The frequency channels of the VOR and the TACAN at each VORTAC facility are "paired" in accordance with a national plan to simplify airborne operation.

1-1-7. Distance Measuring Equipment (DME)

a. In the operation of DME, paired pulses at a specific spacing are sent out from the aircraft (this is the interrogation) and are received at the ground station. The ground station (transponder) then transmits paired pulses back to the aircraft at the same pulse spacing but on a different frequency. The time required for the round trip of this signal exchange is measured in the airborne DME unit and is translated into distance (nautical miles) from the aircraft to the ground station.

b. Operating on the line-of-sight principle, DME furnishes distance information with a very high degree of accuracy. Reliable signals may be received at distances up to 199 NM at line-of-sight altitude with an accuracy of better than $^1/_2$ mile or 3 percent of the distance, whichever is greater. Distance information received from DME equipment is SLANT RANGE distance and not actual horizontal distance.

c. DME operates on frequencies in the UHF spectrum between 962 MHz and 1213 MHz. Aircraft equipped with TACAN equipment will receive distance information from a VORTAC automatically, while aircraft equipped with VOR must have a separate DME airborne unit.

d. VOR/DME, VORTAC, Instrument Landing System (ILS)/DME, and localizer (LOC)/DME navigation facilities established by the FAA provide course and distance information from collocated components under a frequency pairing plan. Aircraft receiving equipment which provides for automatic DME selection assures reception of azimuth and distance information from a common source when designated VOR/DME, VORTAC, ILS/DME, and LOC/DME are selected.

e. Due to the limited number of available frequencies, assignment of paired frequencies is required for certain military noncollocated VOR and TACAN facilities which serve the same area but which may be separated by distances up to a few miles. The military is presently undergoing a program to collocate VOR and TACAN facilities or to assign nonpaired frequencies to those that cannot be collocated.

f. VOR/DME, VORTAC, ILS/DME, and LOC/DME facilities are identified by synchronized identifications which are transmitted on a time share basis. The VOR or localizer portion of the facility is identified by a coded tone modulated at 1020 Hz or

a combination of code and voice. The TACAN or DME is identified by a coded tone modulated at 1350 Hz. The DME or TACAN coded identification is transmitted one time for each three or four times that the VOR or localizer coded identification is transmitted. When either the VOR or the DME is inoperative, it is important to recognize which identifier is retained for the operative facility. A single coded identification with a repetition interval of approximately 30 seconds indicates that the DME is operative.

g. Aircraft equipment which provides for automatic DME selection assures reception of azimuth and distance information from a common source when designated VOR/DME, VORTAC and ILS/DME navigation facilities are selected. Pilots are cautioned to disregard any distance displays from automatically selected DME equipment when VOR or ILS facilities, which do not have the DME feature installed, are being used for position determination.

1-1-8. Navigational Aid (NAVAID) Service Volumes

a. Most air navigation radio aids which provide positive course guidance have a designated standard service volume (SSV). The SSV defines the reception limits of unrestricted NAVAID's which are usable for random/unpublished route navigation.

b. A NAVAID will be classified as restricted if it does not conform to flight inspection signal strength and course quality standards throughout the published SSV. However, the NAVAID should not be considered usable at altitudes below that which could be flown while operating under random route IFR conditions (14 CFR Section 91.177), even though these altitudes may lie within the designated SSV. Service volume restrictions are first published in Notices to Airmen (NOTAM's) and then with the alphabetical listing of the NAVAID's in the A/FD.

c. Standard Service Volume limitations do not apply to published IFR routes or procedures.

d. VOR/DME/TACAN Standard Service Volumes (SSV).

1. Standard service volumes (SSV's) are graphically shown in FIG 1-1-1, FIG 1-1-2, FIG 1-1-3, FIG 1-1-4, and FIG 1-1-5. The SSV of a station is indicated by using the class designator as a prefix to the station type designation.

EXAMPLE-
TVOR, LDME, and HVORTAC.

FIG 1-1-1

Standard High Altitude Service Volume
(See FIG 1-1-5 for altitudes below 1,000 feet).

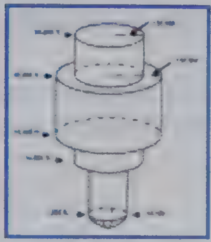


FIG 1-1-2

Standard Low Altitude Service Volume
(See FIG 1-1-5 for altitudes below 1,000 feet).

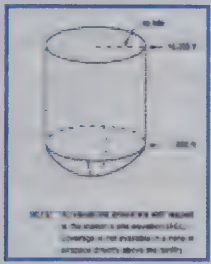
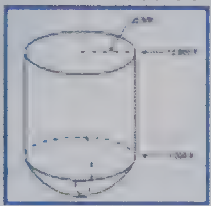


FIG 1-1-3

Standard Terminal Service Volume
(See FIG 1-1-4 for altitudes below 1,000 feet).



2. Within 25 NM, the bottom of the T service volume is defined by the curve in FIG 1-1-4. Within 40 NM, the bottoms of the L and H service volumes are defined by the curve in FIG 1-1-5. (See TBL 1-1-1.)

TBL 1-1-1

VOR/DME/TACAN Standard Service Volumes

SSV Class Designator	Altitude and Range Boundaries
T (Terminal)	From 1,000 feet above ground level (AGL) up to and including 12,000 feet AGL at radial distances out to 25 NM.
L (Low Altitude)	From 1,000 feet AGL up to and including 18,000 feet AGL at radial distances out to 40 NM.
H (High Altitude)	From 1,000 feet AGL up to and including 14,500 feet AGL at radial distances out to 40 NM. From 14,500 AGL up to and including 60,000 feet at radial distances out to 100 NM. From 18,000 feet AGL up to and including 45,000 feet AGL at radial distances out to 130 NM.

e. Nondirectional Radio Beacon (NDB)

1. NDB's are classified according to their intended use.

2. The ranges of NDB service volumes are shown in TBL 1-1-2. The distances (radius) are the same at all altitudes.

TBL 1-1-2

NDB Service Volumes

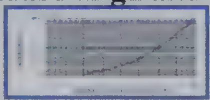
Class	Distance (Radius)
Compass Locator	15 NM
MH	25 NM
H	50 NM*
HH	75 NM
** Service ranges of individual facilities may be less than 50 nautical miles (NM). Restrictions to service volumes are first published as a Notice to Airmen and then with the alphabetical listing of the NAVAID in the A/FD.*	

FIG 1-1-4

Service Volume Lower Edge Terminal

FIG 1-1-5

Service Volume Lower Edge Standard High and Low



1-1-9. Instrument Landing System (ILS)

a. General

1. The ILS is designed to provide an approach path for exact alignment and descent of an aircraft on final approach to a runway.

2. The ground equipment consists of two highly directional transmitting systems and, along the approach, three (or fewer) marker beacons. The directional transmitters are known as the localizer and glide slope transmitters.

3. The system may be divided functionally into three parts:

(a) **Guidance information:** localizer, glide slope;

(b) **Range information:** marker beacon, DME; and

(c) **Visual information:** approach lights, touchdown and centerline lights, runway lights.

4. Compass locators located at the Outer Marker (OM) or Middle Marker (MM) may be substituted for marker beacons. DME, when specified in the procedure, may be substituted for the OM.

5. Where a complete ILS system is installed on each end of a runway; (i.e., the approach end of Runway 4 and the approach end of Runway 22) the ILS systems are not in service simultaneously.

b. Localizer

1. The localizer transmitter operates on one of 40 ILS channels within the frequency range of 108.10 to 111.95 MHz. Signals provide the pilot with course guidance to the runway centerline.

2. The approach course of the localizer is called the front course and is used with other functional parts, e.g., glide slope, marker beacons, etc. The localizer signal is transmitted at the far end of the runway. It is adjusted for a course width of (full scale fly-left to a full scale fly-right) of 700 feet at the runway threshold.

3. The course line along the extended centerline of a runway, in the opposite direction to the front course is called the back course.

CAUTION-
Unless the aircraft's ILS equipment includes reverse sensing capability, when flying inbound on the back course it is necessary to steer the aircraft in the direction opposite the needle deflection when making corrections from off-course to on-course. This "flying away from the needle" is also required when flying outbound on the front course of the localizer. Do not use back course signals for approach unless a back course approach procedure is published for that particular runway and the approach is authorized by ATC.

4. Identification is in International Morse Code and consists of a three-letter identifier preceded by the letter I (••) transmitted on the localizer frequency.

EXAMPLE-
I-DIA

5. The localizer provides course guidance throughout the descent path to the runway threshold from a distance of 18 NM from the antenna between an altitude of 1,000 feet above the highest terrain along the course line and 4,500 feet above the elevation of the antenna site. Proper

off-course indications are provided throughout the following angular areas of the operational service volume:

(a) To 10 degrees either side of the course along a radius of 18 NM from the antenna; and

(b) From 10 to 35 degrees either side of the course along a radius of 10 NM. (See FIG 1-1-6.)

FIG 1-1-6

Limits of Localizer Coverage

6. Unreliable signals may be received outside these areas.

c. Localizer Type Directional Aid (LDA)

1. The LDA is of comparable use and accuracy to a localizer but is not part of a complete ILS. The LDA course usually provides a more precise approach course than the similar Simplified Directional Facility (SDF) installation, which may have a course width of 6 or 12 degrees.

2. The LDA is not aligned with the runway. Straight-in minimums may be published where alignment does not exceed 30 degrees between the course and runway. Circling minimums only are published where this alignment exceeds 30 degrees.

d. Glide Slope/Glide Path

1. The UHF glide slope transmitter, operating on one of the 40 ILS channels within the frequency range 329.15 MHz, to 335.00 MHz radiates its signals in the direction of the localizer front course. The term "glide path" means that portion of the glide slope that intersects the localizer.

CAUTION-
False glide slope signals may exist in the area of the localizer back course approach which can cause the glide slope flag alarm to disappear and present unreliable glide slope information. Disregard all glide slope signal indications when making a localizer back course approach unless a glide slope is specified on the approach and landing chart.

2. The glide slope transmitter is located between 750 feet and 1,250 feet from the approach end of the runway (down the runway) and offset 250 to 650 feet from the runway centerline. It transmits a glide path beam 1.4

degrees wide (vertically). The signal provides descent information for navigation down to the lowest authorized decision height (DH) specified in the approved ILS approach procedure. The glidepath may not be suitable for navigation below the lowest authorized DH and any reference to glidepath indications below that height must be supplemented by visual reference to the runway environment. Glidepaths with no published DH are usable to runway threshold.

3. The glide path projection angle is normally adjusted to 3 degrees above horizontal so that it intersects the MM at about 200 feet and the OM at about 1,400 feet above the runway elevation. The glide slope is normally usable to the distance of 10 NM. However, at some locations, the glide slope has been certified for an extended service volume which exceeds 10 NM.

4. Pilots must be alert when approaching the glidepath interception. False courses and reverse sensing will occur at angles considerably greater than the published path.

5. Make every effort to remain on the indicated glide path.

CAUTION-
Avoid flying below the glide path to assure obstacle/terrain clearance is maintained.

6. The published glide slope threshold crossing height (TCH) DOES NOT represent the height of the actual glide path on-course indication above the runway threshold. It is used as a reference for planning purposes which represents the height above the runway threshold that an aircraft's glide slope antenna should be, if that aircraft remains on a trajectory formed by the four-mile-to-middle marker glidepath segment.

7. Pilots must be aware of the vertical height between the aircraft's glide slope antenna and the main gear in the landing configuration and, at the DH, plan to adjust the descent angle accordingly if the published TCH indicates the wheel crossing height over the runway threshold may not be satisfactory. Tests indicate a comfortable wheel crossing height is approximately 20 to 30 feet, depending on the type of aircraft.

e. Distance Measuring Equipment (DME)

1. When installed with the ILS and specified in the approach procedure, DME may be used:

(a) In lieu of the OM;

(b) As a back course (BC) final approach fix (FAF); and

(c) To establish other fixes on the localizer course.

2. In some cases, DME from a separate facility may be used within

Terminal Instrument Procedures (TERPS) limitations:

(a) To provide ARC initial approach segments;

(b) As a FAF for BC approaches; and

(c) As a substitute for the OM.

f. Marker Beacon

1. ILS marker beacons have a rated power output of 3 watts or less and an antenna array designed to produce an elliptical pattern with dimensions, at 1,000 feet above the antenna, of approximately 2,400 feet in width and 4,200 feet in length. Airborne marker beacon receivers with a selective sensitivity feature should always be operated in the "low" sensitivity position for proper reception of ILS marker beacons.

2. Ordinarily, there are two marker beacons associated with an ILS, the OM and MM. Locations with a Category II ILS also have an Inner Marker (IM). When an aircraft passes over a marker, the pilot will receive the indications shown in TBL 1-1-3.

(a) The OM normally indicates a position at which an aircraft at the appropriate altitude on the localizer course will intercept the ILS glide path.

(b) The MM indicates a position approximately 3,500 feet from the landing threshold. This is also the position where an aircraft on the glide path will be at an altitude of approximately 200 feet above the elevation of the touchdown zone.

(c) The IM will indicate a point at which an aircraft is at a designated decision height (DH) on the glide path between the MM and landing threshold.

TBL 1-1-3

Marker Passage Indications

Marker	Code	Light
OM	- - -	BLUE
MM	• - • -	AMBER
IM	• • • •	WHITE
BC	• • • •	WHITE

3. A back course marker normally indicates the ILS back course final approach fix where approach descent is commenced.

g. Compass Locator

1. Compass locator transmitters are often situated at the MM and OM sites. The transmitters have a power of less than 25 watts, a range of at least 15 miles and operate between 190 and 535 kHz. At some locations, higher powered radio beacons, up to 400 watts, are used as OM compass locators. These generally carry Transcribed Weather Broadcast (TWEB) information.

2. Compass locators transmit two letter identification groups. The outer locator transmits the first two letters of the localizer identification group, and the middle locator transmits the last two letters of the localizer identification group.

h. ILS Frequency (See TBL 1-1-4.)

TBL 1-1-4

Frequency Pairs Allocated for ILS

Localizer MHz	Glide Slope
108.10	334.70
108.15	334.55
108.3	334.10
108.35	333.95
108.5	329.90
108.55	329.75
108.7	330.50
108.75	330.35
108.9	329.30
108.95	329.15
109.1	331.40
109.15	331.25
109.3	332.00
109.35	331.85
109.50	332.60
109.55	332.45
109.70	333.20
109.75	333.05
109.90	333.80
109.95	333.65
110.1	334.40
110.15	334.25
110.3	335.00

110.35	334.85
110.5	329.60
110.55	329.45
110.70	330.20
110.75	330.05
110.90	330.80
110.95	330.65
111.10	331.70
111.15	331.55
111.30	332.30
111.35	332.15
111.50	332.9
111.55	332.75
111.70	333.5
111.75	333.35
111.90	331.1
111.95	330.95

i. ILS Minimums

1. The lowest authorized ILS minimums, with all required ground and airborne systems components operative, are:

(a) Category I. Decision Height (DH) 200 feet and Runway Visual Range (RVR) 2,400 feet (with touchdown zone and centerline lighting, RVR 1,800 feet);

(b) Category II. DH 100 feet and RVR 1,200 feet;

(c) Category IIIa. No DH or DH below 100 feet and RVR not less than 700 feet;

(d) Category IIIb. No DH or DH below 50 feet and RVR less than 700 feet but not less than 150 feet; and

(e) Category IIIc. No DH and no RVR limitation.

NOTE-
Special authorization and equipment required for Categories II and III.

j. Inoperative ILS Components

1. Inoperative localizer. When the localizer fails, an ILS approach is not authorized.

2. Inoperative glide slope. When the glide slope fails, the ILS reverts to

a nonprecision localizer approach.

REFERENCE-
See the inoperative component table in the U.S. Government Terminal Procedures Publication (TPP), for adjustments to minimums due to inoperative airborne or ground system equipment.

k. ILS Course Distortion

1. All pilots should be aware that disturbances to ILS localizer and glide slope courses may occur when surface vehicles or aircraft are operated near the localizer or glide slope antennas. Most ILS installations are subject to signal interference by either surface vehicles, aircraft or both. ILS CRITICAL AREAS are established near each localizer and glide slope antenna.

2. ATC issues control instructions to avoid interfering operations within ILS critical areas at controlled airports during the hours the Airport Traffic Control Tower (ATCT) is in operation as follows:

(a) Weather Conditions. Less than ceiling 800 feet and/or visibility 2 miles.

(1) Localizer Critical Area. Except for aircraft that land, exit a runway, depart or miss approach, vehicles and aircraft are not authorized in or over the critical area when an arriving aircraft is between the ILS final approach fix and the airport. Additionally, when the ceiling is less than 200 feet and/or the visibility is RVR 2,000 or less, vehicle and aircraft operations in or over the area are not authorized when an arriving aircraft is inside the ILS MM.

(2) Glide Slope Critical Area. Vehicles and aircraft are not authorized in the area when an arriving aircraft is between the ILS final approach fix and the airport unless the aircraft has reported the airport in sight and is circling or side stepping to land on a runway other than the ILS runway.

(b) Weather Conditions. At or above ceiling 800 feet and/or visibility 2 miles.

(1) No critical area protective action is provided under these conditions.

(2) A flight crew, under these conditions, should advise the tower that it will conduct an AUTOLAND or COUPLED approach to ensure that the ILS critical areas are protected when

the aircraft is inside the ILS MM.

EXAMPLE-
Glide slope signal not protected.

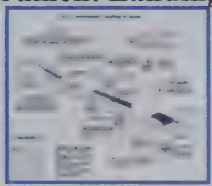
3. Aircraft holding below 5,000 feet between the outer marker and the airport may cause localizer signal variations for aircraft conducting the ILS approach. Accordingly, such holding is not authorized when weather or visibility conditions are less than ceiling 800 feet and/or visibility 2 miles.

4. Pilots are cautioned that vehicular traffic not subject to ATC may cause momentary deviation to ILS course or glide slope signals. Also, critical areas are not protected at uncontrolled airports or at airports with an operating control tower when weather or visibility conditions are above those requiring protective measures. Aircraft conducting coupled or autoland operations should be especially alert in monitoring automatic flight control systems. (See FIG 1-1-7.)

NOTE-
Unless otherwise coordinated through Flight Standards, ILS signals to Category I runways are not flight inspected below 100 feet AGL. Guidance signal anomalies may be encountered below this altitude.

FIG 1-1-7

FAA Instrument Landing Systems



1-1-10. Simplified Directional Facility (SDF)

a. The SDF provides a final approach course similar to that of the ILS localizer. It does not provide glide slope information. A clear understanding of the ILS localizer and the additional factors listed below completely describe the operational characteristics and use of the SDF.

b. The SDF transmits signals within the range of 108.10 to 111.95 MHz.

c. The approach techniques and procedures used in an SDF instrument approach are essentially the same as those employed in executing a standard localizer approach except the SDF course may not be aligned with the runway and the course may be wider, resulting in less precision.

d. Usable off-course indications are limited to 35 degrees either side of the course centerline. Instrument indications received beyond 35 degrees should be disregarded.

e. The SDF antenna may be offset from the runway centerline. Because of this, the angle of convergence between the final approach course and the runway bearing should be determined by reference to the instrument approach procedure chart. This angle is generally not more than 3 degrees. However, it should be noted that inasmuch as the approach course originates at the antenna site, an approach which is continued beyond the runway threshold will lead the aircraft to the SDF offset position rather than along the runway centerline.

f. The SDF signal is fixed at either 6 degrees or 12 degrees as necessary to provide maximum flyability and optimum course quality.

g. Identification consists of a three-letter identifier transmitted in Morse Code on the SDF frequency. The appropriate instrument approach chart will indicate the identifier used at a particular airport.

1-1-11. Microwave Landing System (MLS)

a. General

1. The MLS provides precision navigation guidance for exact alignment and descent of aircraft on approach to a runway. It provides azimuth, elevation, and distance.

2. Both lateral and vertical guidance may be displayed on conventional course deviation indicators or incorporated into multipurpose cockpit displays. Range information can be displayed by conventional DME indicators and also incorporated into multipurpose displays.

3. The MLS supplements the ILS as the standard landing system in the U.S. for civil, military, and international civil aviation. At international airports, ILS service is protected to 2010.

4. The system may be divided into five functions:

(a) Approach azimuth;

(b) Back azimuth;

(c) Approach elevation;

(d) Range; and

(e) Data communications.

5. The standard configuration of MLS ground equipment includes:

(a) An azimuth station to perform functions (a) and (e) above. In addition to providing azimuth navigation guidance, the station transmits basic data which consists of information associated directly with the operation of the landing system, as well as advisory data on the performance

of the ground equipment.

(b) An elevation station to perform function (c).

(c) Distance Measuring Equipment (DME) to perform range guidance, both standard DME (DME/N) and precision DME (DME/P).

6. MLS Expansion Capabilities. The standard configuration can be expanded by adding one or more of the following functions or characteristics.

(a) Back azimuth. Provides lateral guidance for missed approach and departure navigation.

(b) Auxiliary data transmissions. Provides additional data, including refined airborne positioning, meteorological information, runway status, and other supplementary information.

(c) Expanded Service Volume (ESV) proportional guidance to 60 degrees.

7. MLS identification is a four-letter designation starting with the letter M. It is transmitted in International Morse Code at least six times per minute by the approach azimuth (and back azimuth) ground equipment.

b. Approach Azimuth Guidance

1. The azimuth station transmits MLS angle and data on one of 200 channels within the frequency range of 5031 to 5091 MHz.

2. The equipment is normally located about 1,000 feet beyond the stop end of the runway, but there is considerable flexibility in selecting sites. For example, for heliport operations the azimuth transmitter can be collocated with the elevation transmitter.

3. The azimuth coverage extends: (See FIG 1-1-8.)

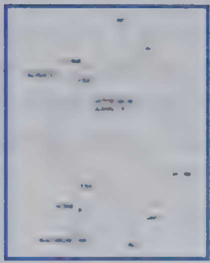
(a) Laterally, at least 40 degrees on either side of the runway centerline in a standard configuration,

(b) In elevation, up to an angle of 15 degrees and to at least 20,000 feet, and

(c) In range, to at least 20 NM.

FIG 1-1-8

Coverage Volume
Azimuth



c. Elevation Guidance

1. The elevation station transmits signals on the same frequency as the azimuth station. A single frequency is time-shared between angle and data functions.

2. The elevation transmitter is normally located about 400 feet from the side of the runway between runway threshold and the touchdown zone.

3. Elevation coverage is provided in the same airspace as the azimuth guidance signals:

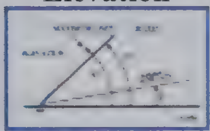
(a) In elevation, to at least +15 degrees;

(b) Laterally, to fill the Azimuth lateral coverage; and

(c) In range, to at least 20 NM. (See FIG 1-1-9.)

FIG 1-1-9

Coverage Volumes
Elevation



d. Range Guidance

1. The MLS Precision Distance Measuring Equipment (DME/P) functions the same as the navigation DME described in paragraph 1-1-7, Distance Measuring Equipment (DME), but there are some technical differences. The beacon transponder operates in the frequency band 962 to 1105 MHz and responds to an aircraft interrogator. The MLS DME/P accuracy is improved to be consistent with the accuracy provided by the MLS azimuth and elevation stations.

2. A DME/P channel is paired with the azimuth and elevation channel. A complete listing of the 200 paired channels of the DME/P with the angle functions is contained in FAA Standard 022 (MLS Interoperability and Performance Requirements).

3. The DME/N or DME/P is an integral part of the MLS and is installed at all MLS facilities unless a waiver is obtained. This occurs infrequently and only at outlying, low density airports where marker beacons or compass locators are already in place.

e. Data Communications

1. The data transmission can include both the basic and auxiliary data words. All MLS facilities transmit basic data. Where needed, auxiliary data can be transmitted.

2. Coverage limits. MLS data are transmitted throughout the azimuth (and back azimuth when provided) coverage sectors.

3. Basic data content. Representative data include:

(a) Station identification;

(b) Exact locations of azimuth, elevation and DME/P stations (for MLS receiver processing functions);

(c) Ground equipment performance level; and

(d) DME/P channel and status.

4. Auxiliary data content: Representative data include:

(a) 3-D locations of MLS equipment;

(b) Waypoint coordinates;

(c) Runway conditions; and

(d) Weather (e.g., RVR, ceiling, altimeter setting, wind, wake vortex, wind shear).

f. Operational Flexibility

1. The MLS has the capability to fulfill a variety of needs in the approach, landing, missed approach and departure phases of flight. For example:

(a) Curved and segmented approaches;

(b) Selectable glide path angles;

(c) Accurate 3-D positioning of the aircraft in space; and

(d) The establishment of boundaries to ensure clearance from obstructions in the terminal area.

2. While many of these capabilities are available to any MLS-equipped aircraft, the more sophisticated capabilities (such as curved and segmented approaches) are dependent upon the particular capabilities of the airborne equipment.

g. Summary

1. Accuracy. The MLS provides precision three-dimensional navigation guidance accurate enough for all approach and landing maneuvers.

2. Coverage. Accuracy is consistent throughout the coverage volumes. (See FIG 1-1-10.)

FIG 1-1-10

Coverage Volumes
3-D Representation

3. Environment. The system has low susceptibility to interference from weather conditions and airport ground traffic.

4. Channels. MLS has 200 channels- enough for any foreseeable need.

5. Data. The MLS transmits ground-air data messages associated with the systems operation.

6. Range information. Continuous range information is provided with an accuracy of about 100 feet.

1-1-12. NAVAID Identifier Removal During Maintenance

During periods of routine or emergency maintenance, coded identification (or code and voice, where applicable) is removed from certain FAA NAVAID's. Removal of identification serves as a warning to pilots that the facility is officially off the air for tune-up or repair and may be unreliable even though intermittent or constant signals are received.

NOTE-
During periods of maintenance VHF ranges may radiate a T-E-S-T code (-••••-).

1-1-13. NAVAID's with Voice

a. Voice equipped en route radio navigational aids are under the operational control

of either an FAA Automated Flight Service Station (AFSS) or an approach control facility. The voice communication is available on some facilities. The Hazardous Inflight Weather Advisory Service (HIWAS) broadcast capability on selected VOR sites is in the process of being implemented throughout the conterminous U.S. and does not provide voice communication. The availability of two-way voice communication and HIWAS is indicated in the A/FD and aeronautical charts.

b. Unless otherwise noted on the chart, all radio navigation aids operate continuously except during shutdowns for maintenance. Hours of operation of facilities not operating continuously are annotated on charts and in the A/FD.

1-1-14. User Reports on NAVAID Performance

a. Users of the National Airspace System (NAS) can render valuable assistance in the early correction of NAVAID malfunctions by reporting their observations of undesirable NAVAID performance. Although NAVAID's are monitored by electronic detectors, adverse effects of electronic interference, new obstructions or changes in terrain near the NAVAID can exist without detection by the ground monitors. Some of the characteristics of malfunction or deteriorating performance which should be reported are: erratic course or bearing indications; intermittent, or full, flag alarm; garbled, missing or obviously improper coded identification; poor quality communications reception; or, in the case of frequency interference, an audible hum or tone accompanying radio communications or NAVAID identification.

b. Reporters should identify the NAVAID, location of the aircraft, time of the observation, type of aircraft and describe the condition observed; the type of receivers in use is also useful information. Reports can be made in any of the following ways:

1. Immediate report by direct radio communication to the controlling Air Route Traffic Control Center (ARTCC), Control Tower, or FSS. This method provides the quickest result.

2. By telephone to the nearest FAA facility.

3. By FAA Form 8000-7, Safety Improvement Report, a postage-paid card designed for this purpose. These cards may be obtained at FAA FSS's, Flight Standards District Offices, and General Aviation Fixed Base Operations.

c. In aircraft that have more than one receiver, there are many combinations of possible interference between units. This can cause either erroneous navigation indications or, complete or partial blanking out of the communications. Pilots should be familiar enough with the radio installation of the particular airplanes they fly to recognize this type of interference.

1-1-15. LORAN

a. Introduction

1. LORAN, which uses a network of land-based radio transmitters, was developed to provide an accurate system for LOng RAnge Navigation. The system was configured to provide reliable, all weather navigation for marine users along the U.S. coasts and in the Great Lakes. The current system, known as LORAN-C, was the third version of four developed since World War II.

2. With an expanding user group in the general aviation community, the LORAN coastal facilities were augmented in 1991 to provide signal coverage over the entire continental U.S. The FAA and the U.S. Coast Guard (USCG) are incorporating LORAN into the NAS for supplemental en route and nonprecision approach operations. LORAN-C is also supported in the Canadian airspace system. This guide is intended to provide an introduction to the LORAN system, LORAN avionics, the use of LORAN for aircraft navigation, and to examine the possible future of LORAN in aviation.

b. LORAN Chain

1. The 27 U.S. LORAN transmitters that provide signal coverage for the continental U.S. and the southern half of Alaska are distributed from Caribou, ME, to Attu Island in the Aleutians. Station operations are organized into sub-groups of four to six stations called "chains." One station in the chain is designated the "Master" and the others are "secondary" stations.

2. The LORAN navigation signal is a carefully structured sequence of brief radio frequency pulses centered at 100 kHz. The sequence of signal transmissions consists of a pulse group from the Master (M) station followed at precise time intervals by groups from the secondary stations which are designated by the U.S. Coast Guard with the letters V, W, X, Y and Z. All secondary stations radiate pulses in groups of eight, but the Master signal for identification has an additional ninth pulse.

3. The time interval between the reoccurrence of the Master pulse group is the Group Repetition Interval (GRI). The GRI is the same for all stations in a chain and each LORAN chain has a unique GRI. Since all stations in a particular chain operate on the same radio frequency, the GRI is the key by which a LORAN receiver can identify and isolate signal groups from a specific chain.

EXAMPLE-
Transmitters in the northeast U.S. chain operate with a GRI of 99,600 microseconds which is shortened to 9960 for convenience. The master station (m) at Sseneca, NY, controls: secondary stations (w) at Caribou, ME; (x) at Nantucket, MA; (y) at Carolina Beach, NC; and (z) at Dana, IN. In order to keep chain operations precise, the system uses monitor receivers at Cape Elizabeth, ME, Sandy Hook, NJ and Plumbrook, OH. Monitor receivers continuously measure various aspects of the quality and accuracy of LORAN signals and report system status to a control station where chain timing is maintained.

4. The line between the Master and each secondary station is the "baseline" for a pair of stations. Typical baselines are from 600 to 1,000 nautical miles in length. The continuation of the baseline in either direction is a "baseline extension."

5. LORAN transmitter stations have time and control equipment, a transmitter, auxiliary power equipment, a building about 100 by 30 feet in size and an antenna that is about 700 feet tall. A station generally requires approximately 100 or more acres of land to accommodate guy lines that keep the antenna in position. Each LORAN station transmits from 400 to 1,600 kilowatts of signal power.

6. The USCG operates 27 stations, comprising eight chains, in the U.S. NAS. Four control stations, which monitor chain performance, have personnel on duty full time. The Canadian east and west coast chains also provide signal coverage over small areas of the NAS.

7. When a control station detects a signal problem that could affect navigation accuracy, an alert signal called "Blink" is activated. Blink is a distinctive change in the group of eight pulses that can be recognized automatically by a receiver so the user is notified instantly that the LORAN system should not be used for navigation. In addition, other problems can cause signal transmissions from a station to be halted.

8. Each individual LORAN chain provides navigation-quality signal coverage over an identified area as shown for the West Coast chain, GRI 9940. The chain Master station is at Fallon, NV, and secondary stations are at George, WA; Middletown, CA; and Searchlight, NV. In a signal coverage area the signal strength relative to the normal ambient radio noise must be adequate to assure successful reception.

FIG 1-1-11

LORAN C
Pulse

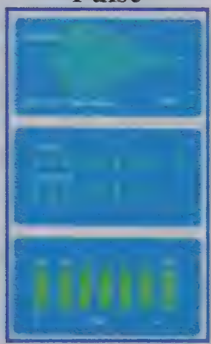
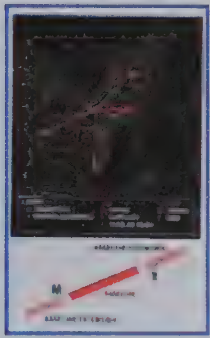


FIG 1-1-12

LORAN C
Northeast U.S. Chain



c. The LORAN Receiver

1. Before a LORAN receiver can provide navigation information for a pilot, it must successfully receive, or "acquire," signals from three or more stations in a chain. Acquisition involves the time synchronization of the receiver with the chain GRI, identification of the Master station signals from among those checked, identification of secondary station signals, and the proper selection of the point in each signal at which measurements should be made.

2. Signal reception at any site will require a pilot to provide location information such as approximate latitude and longitude, or the GRI to be used, to the receiver. Once activated, most receivers will store present location information for later use.

3. The basic measurements made by LORAN receivers are the differences in time-of-arrival between the Master signal and the signals from each of the secondary stations of a chain. Each "time difference" (TD) value is measured to a precision of about 0.1 microseconds. As a rule of thumb, 0.1 microsecond is equal to about 100 feet.

4. An aircraft's LORAN receiver must recognize three signal conditions:

(a) Usable signals;

(b) Absence of signals; and

(c) Signal blink.

5. The most critical phase of flight is during the approach to landing at an airport. During the approach phase the receiver must detect a lost signal, or a signal Blink, within 10 seconds of the occurrence and warn the pilot of the event.

6. Most receivers have various internal tests for estimating the probable accuracy of the current TD values and consequent navigation solutions. Tests may include verification of the timing alignment of the receiver clock with the LORAN pulse, or a continuous measurement of the signal-to-noise ratio (SNR). SNR is the relative strength of the LORAN

signals compared to the local ambient noise level. If any of the tests fail, or if the quantities measured are out of the limits set for reliable navigation, then an alarm will be activated to alert the pilot.

7. LORAN signals operate in the low frequency band around (100 kHz) that has been reserved for LORAN use. Adjacent to the band, however, are numerous low frequency communications transmitters. Nearby signals can distort the LORAN signals and must be eliminated by the receiver to assure proper operation. To eliminate interfering signals, LORAN receivers have selective internal filters. These filters, commonly known as "notch filters" reduce the effect of interfering signals.

8. Careful installation of antennas, good metal-to-metal electrical bonding, and provisions for precipitation noise discharge on the aircraft are essential for the successful operation of LORAN receivers. A LORAN antenna should be installed on an aircraft in accordance with the manufacturer's instructions. Corroded bonding straps should be replaced, and static discharge devices installed at points indicated by the aircraft manufacturer.

FIG 1-1-13

LORAN- C
West Coast Chain

d. LORAN Navigation

1. An airborne LORAN receiver has four major parts:

(a) Signal processor;

(b) Navigation computer;

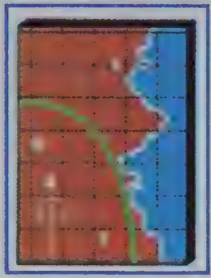
(c) Control/display; and

(d) Antenna.

2. The signal processor acquires LORAN signals and measures the difference between the time-of-arrival of each secondary station pulse group and the Master station pulse group. The measured TD's depend on the location of the receiver in relation to the three or more transmitters.

FIG 1-1-14

First Line-of-Position



(a) The first TD will locate an aircraft somewhere on a line-of-position (LOP) on which the receiver will measure the same TD value.

(b) A second LOP is defined by a TD measurement between the Master station signal and the signal from another secondary station.

FIG 1-1-15

Second Line-of-Position

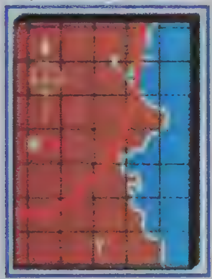
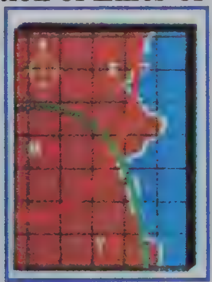


FIG 1-1-16

Intersection of Lines-of-Position



(c) The intersection of the measured LOP's is the position of the aircraft.

3. The navigation computer converts TD values to corresponding latitude and longitude. Once the time and position of the aircraft is established at

two points, distance to destination, cross track error, ground speed, estimated time of arrival, etc., can be determined. Cross track error can be displayed as the vertical needle of a course deviation indicator, or digitally, as decimal parts of a mile left or right of course. During a nonprecision approach, course guidance must be displayed to the pilot with a full scale deviation of ±0.30 nautical miles or greater.

4. LORAN navigation for nonprecision approaches requires accurate and reliable information. During an approach the occurrence of signal Blink or loss of signal must be detected within 10 seconds and the pilot must be notified. LORAN signal accuracy for approaches is 0.25 nautical miles, well within the required accuracy of 0.30 nautical miles. LORAN signal accuracy can be improved by applying correction values.

5. Flying a LORAN nonprecision approach is different from flying a VOR approach. A VOR approach is on a radial of the VOR station, with guidance sensitivity increasing as the aircraft nears the airport. The LORAN system provides a linear grid, so there is constant guidance sensitivity everywhere in the approach procedure. Consequently, inaccuracies and ambiguities that occur during operations in close proximity to VOR's (station passage, for example) do not occur in LORAN approaches.

6. The navigation computer also provides storage for data entered by pilot or provided by the receiver manufacturer. The receiver's database is updated at local maintenance facilities every 60 days to include all changes made by the FAA.

7. The FAA is currently canceling all LORAN nonprecision approaches with the advent of Global Positioning System (GPS).

e. Notices to Airmen (NOTAM's) are issued for LORAN-C chain or station outages. Domestic NOTAM (D)'s are issued under the identifier "LRN." International NOTAM's are issued under the KNMH series. Pilots may obtain these NOTAM's from FSS briefers upon request.

FIG 1-1-17

North Pacific Chain

FIG 1-1-18

Coverage Over Alaska

FIG 1-1-19

Canadian West Coast Chain

FIG 1-1-20

U.S. West Coast Chain

FIG 1-1-21

North Central U.S. Chain

FIG 1-1-22

South Central U.S. Chain

FIG 1-1-23

U.S. Great Lakes Chain

FIG 1-1-24

U.S. Southeast Chain

FIG 1-1-25

Northeast U.S. Chain

FIG 1-1-26

Canadian East Coast Chain

f. LORAN-C status information

Prerecorded telephone answering service messages pertaining to LORAN-C are available in TBL 1-1-5 and TBL 1-1-6.

g. The U.S. will continue to operate the LORAN-C system in the short term beyond the previously planned December 31, 2000, termination date while continuing to evaluate the long-term need for continuation of the system. Users will be given reasonable notice if it is concluded that LORAN-C is not needed or is not cost effective, so that they will have the opportunity to transition to alternative navigation aids.

TBL 1-1-5

Prerecorded LORAN-C Status Information

Rate	Chain	Telephone
5930	Canadian East Coast	(709) 454-3261*
7980	Southeast U.S.	(904) 569-5241
8970	Great Lakes	(607) 869-5395
9960	Northeast U.S.	(607) 869-5395
**St. Anthony, Newfoundland, Canada. Information can also be obtained directly from the office of the Coordinator of Chain Operations (COCO) for each chain. The following telephone numbers are for each COCO office.*		

TBL 1-1-6

LORAN-C Coordinator of Chain Operations Telephone Numbers

Rate	Chain	Telephone	Location
4990	Central Pacific	808-247-5591	Kaneohe, HI
5930	Canadian East Coast	709-454-2392	St. Antony, NF
5990	Canadian West Coast	604-666-0472	Vancover, BC
7930	North Atlantic	011-44-1-409-4758	London, UK
7960	Gulf of Alaska	907-487-5583	Kodiak, AK
7970	Norwegian Sea	011-44-1-409-4758	London, UK
7980	Southeast U.S.	205-899-5225	Malone, FL
7990	Mediterranean Sea	011-44-1-409-4758	London, UK

8290	North Central U.S.	707-987-2911	Middletown, CA
8970	Great Lakes	607-869-5393	Seneca, NY
9610	South Central U.S.	205-899-5225	Malone, FL
9940	West Coast U.S.	707-987-2911	Middletown, CA
9960	Northeast U.S.	607-869-5393	Seneca, NY
9970	Northwest Pacific	415-437-3224	San Francisco, CA
9990	North Pacific	907-487-5583	Kodiak, AK

1-1-16. OMEGA and OMEGA/Very Low Frequency (VLF) Navigation Systems

OMEGA operations were terminated on September 30, 1997.

1-1-17. VHF Direction Finder

a. The VHF Direction Finder (VHF/DF) is one of the common systems that helps pilots without their being aware of its operation. It is a ground-based radio receiver used by the operator of the ground station. FAA facilities that provide VHF/DF service are identified in the A/FD.

b. The equipment consists of a directional antenna system and a VHF radio receiver.

c. The VHF/DF receiver display indicates the magnetic direction of the aircraft from the ground station each time the aircraft transmits.

d. DF equipment is of particular value in locating lost aircraft and in helping to identify aircraft on radar.

REFERENCE-

AIM, Direction Finding Instrument Approach Procedure, Paragraph 6-2-3.

1-1-18. Inertial Navigation System (INS)

The Inertial Navigation System is a totally self-contained navigation system, comprised of gyros, accelerometers, and a navigation computer, which provides aircraft position and navigation information in response to signals resulting from inertial effects on system components, and does not require information from external references. INS is aligned with accurate position information prior to departure, and thereafter calculates its position as it progresses to the destination. By programming a series of waypoints, the system will navigate along a predetermined track. New waypoints can be inserted at any time if a revised routing is desired. INS accuracy is very high initially following alignment, and decays with time at the rate of about 1-2 nautical miles per hour. Position update alignment can be accomplished inflight using ground-based references, and many INS systems now have sophisticated automatic update using dual DME and or VOR inputs. INS may be approved as the sole means of navigation or may be used in combination with other systems.

1-1-19. Doppler Radar

Doppler Radar is a semiautomatic self-contained dead reckoning navigation system (radar sensor

plus computer) which is not continuously dependent on information derived from ground based or external aids. The system employs radar signals to detect and measure ground speed and drift angle, using the aircraft compass system as its directional reference. Doppler is less accurate than INS or OMEGA however, and the use of an external reference is required for periodic updates if acceptable position accuracy is to be achieved on long range flights.

1-1-20. Flight Management System (FMS)

The FMS is a computer system that uses a large database to allow routes to be preprogrammed and fed into the system by means of a data loader. The system is constantly updated with respect to position accuracy by reference to conventional navigation aids. The sophisticated program and its associated database insures that the most appropriate aids are automatically selected during the information update cycle.

1-1-21. Global Positioning System (GPS)

a. System Overview

1. GPS is a U.S. satellite-based radio navigational, positioning, and time transfer system operated by the Department of Defense (DOD). The system provides highly accurate position and velocity information and precise time on a continuous global basis to an unlimited number of properly-equipped users. The system is unaffected by weather and provides a worldwide common grid reference system based on the earth-fixed coordinate system. For its earth model, GPS uses the World Geodetic System of 1984 (WGS-84) datum.

2. GPS provides two levels of service: Standard Positioning Service (SPS) and Precise Positioning Service (PPS). SPS provides, to all users, horizontal positioning accuracy of 100 meters, or less, with a probability of 95 percent and 300 meters with a probability of 99.99 percent. PPS is more accurate than SPS; however, this is limited to authorized U.S. and allied military, federal government, and civil users who can satisfy specific U.S. requirements.

3. GPS operation is based on the concept of ranging and triangulation from a group of satellites in space which act as precise reference points. A GPS receiver measures distance from a satellite using the travel time of a radio signal. Each satellite transmits a specific code, called a coarse acquisition (C/A) code, which contains information on the satellite's position, the GPS system time, and the health and accuracy of the transmitted data. Knowing the speed at which the signal traveled (approximately 186,000 miles per second) and the exact broadcast time, the distance traveled by the signal can be computed from the arrival time.

4. The GPS receiver matches each satellite's C/A code with an identical copy of the code contained in the receiver's database. By shifting its copy of the satellite's code in a matching process, and by comparing this shift with its internal clock, the receiver can calculate how long it took the signal to travel from the satellite to the receiver. The distance derived

from this method of computing distance is called a pseudo-range because it is not a direct measurement of distance, but a measurement based on time. Pseudo-range is subject to several error sources; for example: ionospheric and tropospheric delays and multipath.

5. In addition to knowing the distance to a satellite, a receiver needs to know the satellite's exact position in space; this is known as its ephemeris. Each satellite transmits information about its exact orbital location. The GPS receiver uses this information to precisely establish the position of the satellite.

6. Using the calculated pseudo-range and position information supplied by the satellite, the GPS receiver mathematically determines its position by triangulation. The GPS receiver needs at least four satellites to yield a three-dimensional position (latitude, longitude, and altitude) and time solution. The GPS receiver computes navigational values such as distance and bearing to a waypoint, ground speed, etc., by using the aircraft's known latitude/longitude and referencing these to a database built into the receiver.

7. The GPS constellation of 24 satellites is designed so that a minimum of five are always observable by a user anywhere on earth. The receiver uses data from a minimum of four satellites above the mask angle (the lowest angle above the horizon at which it can use a satellite).

8. The GPS receiver verifies the integrity (usability) of the signals received from the GPS constellation through receiver autonomous integrity monitoring (RAIM) to determine if a satellite is providing corrupted information. At least one satellite, in addition to those required for navigation, must be in view for the receiver to perform the RAIM function; thus, RAIM needs a minimum of 5 satellites in view, or 4 satellites and a barometric altimeter (baro-aiding) to detect an integrity anomaly. For receivers capable of doing so, RAIM needs 6 satellites in view (or 5 satellites with baro-aiding) to isolate the corrupt satellite signal and remove it from the navigation solution. Baro-aiding is a method of augmenting the GPS integrity solution by using a nonsatellite input source. GPS derived altitude should not be relied upon to determine aircraft altitude since the vertical error can be quite large. To ensure that baro-aiding is available, the current altimeter setting must be entered into the receiver as described in the operating manual.

9. RAIM messages vary somewhat between receivers; however, generally there are two types. One type indicates that there are not enough satellites available to provide RAIM integrity monitoring and another type indicates that the RAIM integrity monitor has detected a potential error that exceeds the limit for the current phase of flight. **Without RAIM capability, the pilot has no assurance of the accuracy of the GPS position.**

10. The DOD declared initial operational capability (IOC) of the U.S. GPS on December 8, 1993. The FAA has granted approval for U.S. civil operators to use properly certified GPS equipment as a primary means of

navigation in oceanic airspace and certain remote areas. Properly certified GPS equipment may be used as a supplemental means of IFR navigation for domestic en route, terminal operations, and certain instrument approach procedures (IAP's). This approval permits the use of GPS in a manner that is consistent with current navigation requirements as well as approved air carrier operations specifications.

b. VFR Use of GPS

1. GPS navigation has become a great asset to VFR pilots, providing increased navigation capability and enhanced situational awareness, while reducing operating costs due to greater ease in flying direct routes. While GPS has many benefits to the VFR pilot, care must be exercised to ensure that system capabilities are not exceeded.

2. Types of receivers used for GPS navigation under VFR are varied, from a full IFR installation being used to support a VFR flight, to a VFR only installation (in either a VFR or IFR capable aircraft) to a hand-held receiver. The limitations of each type of receiver installation or use must be understood by the pilot to avoid misusing navigation information. (See TBL 1-1-8.) In all cases, VFR pilots should never rely solely on one system of navigation. GPS navigation must be integrated with other forms of electronic navigation (when possible), as well as pilotage and dead reckoning. Only through the integration of these techniques can the VFR pilot ensure accuracy in navigation.

3. Some critical concerns in VFR use of GPS include RAIM capability, database currency and antenna location.

(a) RAIM Capability. Many VFR GPS receivers and all hand-held units have no RAIM alerting capability. Loss of the required number of satellites in view, or the detection of a position error, cannot be displayed to the pilot by such receivers. In receivers with no RAIM capability, no alert would be provided to the pilot that the navigation solution had deteriorated, and an undetected navigation error could occur. A systematic cross-check with other navigation techniques would identify this failure, and prevent a serious deviation. See subparagraphs a8 and a9 for more information on RAIM.

(b) Database Currency

(1) In many receivers, an up-datable database is used for navigation fixes, airports, and instrument procedures. These databases must be maintained to the current update for IFR operation, but no such requirement exists for VFR use.

(2) However, in many cases, the database drives

a moving map display which indicates Special Use Airspace and the various classes of airspace, in addition to other operational information. Without a current database the moving map display may be outdated and offer erroneous information to VFR pilots wishing to fly around critical airspace areas, such as a Restricted Area or a Class B airspace segment. Numerous pilots have ventured into airspace they were trying to avoid by using an outdated database. If you don't have a current database in the receiver, disregard the moving map display for critical navigation decisions.

(3) In addition, waypoints are added, removed, relocated, or re-named as required to meet operational needs. When using GPS to navigate relative to a named fix, a current database must be used to properly locate a named waypoint. Without the update, it is the pilot's responsibility to verify the waypoint location referencing to an official current source, such as the Airport/Facility Directory, Sectional Chart, or En Route Chart.

(c) Antenna Location

(1) In many VFR installations of GPS receivers, antenna location is more a matter of convenience than performance. In IFR installations, care is exercised to ensure that an adequate clear view is provided for the antenna to see satellites. If an alternate location is used, some portion of the aircraft may block the view of the antenna, causing a greater opportunity to lose navigation signal.

(2) This is especially true in the case of hand-helds. The use of hand-held receivers for VFR operations is a growing trend, especially among rental pilots. Typically, suction cups are used to place the GPS antennas on the inside of cockpit windows. While this method has great utility, the antenna location is limited to the cockpit or cabin only and is rarely optimized to provide a clear view of available satellites. Consequently, signal losses may occur in certain situations of aircraft-satellite geometry, causing a loss of navigation signal. These losses, coupled with a lack of RAIM capability, could present erroneous position and navigation information with no warning to the pilot.

(3) While the use of a hand-held GPS for VFR operations is not limited by regulation, modification of the aircraft, such as installing a panel- or yoke-mounted holder, is governed by 14 CFR Part 43. Consult with your mechanic to ensure compliance with the regulation, and a safe installation.

4. As a result of these and other concerns, here are some tips for using GPS for VFR operations:

(a) Always check to see if your unit has RAIM capability. If no RAIM capability exists, be suspicious of your GPS position when any disagreement exists with the position derived from other radio navigation systems, pilotage, or dead reckoning.

(b) Check the currency of the database, if any. If expired, update the database using the current revision. If an update of an expired database is not possible, disregard any moving map display of airspace for critical navigation decisions. Be aware that named waypoints may no longer exist or may have been relocated since the database expired. At a minimum, the waypoints planned to be used should be checked against a current official source, such as the Airport/Facility Directory, or a Sectional Aeronautical Chart.

(c) While hand-helds can provide excellent navigation capability to VFR pilots, be prepared for intermittent loss of navigation signal, possibly with no RAIM warning to the pilot. If mounting the receiver in the aircraft, be sure to comply with 14 CFR Part 43.

(d) Plan flights carefully before taking off. If you wish to navigate to user-defined waypoints, enter them before flight, not on-the-fly. Verify your planned flight against a current source, such as a current sectional chart. There have been cases in which one pilot used waypoints created by another pilot that were not where the pilot flying was expecting. This generally resulted in a navigation error. Minimize head-down time in the aircraft and keep a sharp lookout for traffic, terrain, and obstacles. Just a few minutes of preparation and planning on the ground will make a great difference in the air.

(e) Another way to minimize head-down time is to become very familiar with your receiver's operation. Most receivers are not intuitive. The pilot must take the time to learn the various keystrokes, knob functions, and displays that are used in the operation of the receiver. Some manufacturers provide computer-based tutorials or simulations of their receivers. Take the time to learn about your particular unit before you try to use it in flight.

5. In summary, be careful not to rely on GPS to solve all your VFR navigational problems. Unless an IFR receiver is installed in accordance with IFR requirements, no standard of accuracy or integrity has been assured. While the practicality of GPS is compelling, the fact remains that only the pilot can navigate the aircraft, and GPS is just one of the pilot's tools to do the job.

c. VFR Waypoints

1. VFR waypoints provide VFR pilots with a supplementary tool to assist with position awareness while navigating visually in aircraft equipped with area navigation receivers. VFR waypoints should be used as a tool to supplement current navigation procedures. The uses of VFR waypoints include providing navigational aids for pilots unfamiliar with an area, waypoint definition of existing reporting points, enhanced navigation in and around Class B and Class C airspace, and enhanced navigation around Special Use Airspace. VFR pilots should rely on appropriate and current aeronautical charts published specifically for visual navigation. If operating in a terminal area, pilots should take advantage of the Terminal Area Chart available for that area, if published. The use of VFR waypoints does not relieve the pilot of any responsibility to comply with the operational requirements of 14 CFR Part 91.

2. VFR waypoint names (for computer-entry and flight plans) consist of five letters beginning with the letters "VP" and are retrievable from navigation databases. **NOTICE: Effective on 6/15/00 VFR waypoint names shall consist of five letters beginning with the letters "VP." The change is effective for all GPS databases and aviation publications. The Los Angeles Helicopter Route Chart depicts VFR waypoint names beginning with "VV." The chart will be updated to the "VP" naming convention at the next publication of the chart.** The VFR waypoint names are not intended to be pronounceable, and they are not for use in ATC communications. On VFR charts, stand-alone VFR waypoints will be portrayed using the same four-point star symbol used for IFR waypoints. VFR waypoints collocated with visual check points on the chart will be identified by small magenta flag symbols. VFR waypoints collocated with visual check points will be pronounceable based on the name of the visual check point and may be used for ATC communications. Each VFR waypoint name will appear in parentheses adjacent to the geographic location on the chart. Latitude/longitude data for all established VFR waypoints may be found in the appropriate regional Airport/Facility Directory (A/FD).

3. VFR waypoints shall not be used to plan flights under IFR. VFR waypoints will not be recognized by the IFR system and will be rejected for IFR routing purposes.

4. When filing VFR flight plans, pilots may use the five letter identifier as a waypoint in the route of flight section if there is an intended course change at that point or if used to describe the planned route of flight. This VFR filing would be similar to how a VOR would be used in a

route of flight. Pilots must use the VFR waypoints only when operating under VFR conditions.

5. Any VFR waypoints intended for use during a flight should be loaded into the receiver while on the ground and prior to departure. Once airborne, pilots should avoid programming routes or VFR waypoint chains into their receivers.

6. Pilots should be especially vigilant for other traffic while operating near VFR waypoints. The same effort to see and avoid other aircraft near VFR waypoints will be necessary, as was the case with VOR's and NDB's in the past. In fact, the increased accuracy of navigation through the use of GPS will demand even greater vigilance, as off-course deviations among different pilots and receivers will be less. When operating near a VFR waypoint, use whatever ATC services are available, even if outside a class of airspace where communications are required. Regardless of the class of airspace, monitor the available ATC frequency closely for information on other aircraft operating in the vicinity. It is also a good idea to turn on your landing light(s) when operating near a VFR waypoint to make your aircraft more conspicuous to other pilots, especially when visibility is reduced. See paragraph 7-5-2, VFR in Congested Areas, for more information.

d. The Gulf of Mexico Grid System

1. On October 8, 1998, the Southwest Region of the FAA, with assistance from the Helicopter Safety Advisory Conference (HSAC), implemented the world's first Instrument Flight Rules (IFR) Grid System in the Gulf of Mexico. This navigational route structure is completely independent of ground-based navigation aids (NAVAID's) and was designed to facilitate helicopter IFR operations to offshore destinations. The Grid System is defined by over 300 offshore waypoints located 20 minutes apart (latitude and longitude). Flight plan routes are routinely defined by just 4 segments; departure point (lat/long), first en route grid waypoint, last en route grid waypoint prior to approach procedure, and destination point (lat/long). There are over 4,000 possible offshore landing sites. Upon reaching the waypoint prior to the destination, the pilot may execute an Offshore Standard Approach Procedure (OSAP), a Helicopter En Route Descent Areas (HEDA) approach, or an Airborne Radar Approach (ARA). For more information on these helicopter instrument procedures, refer to FAA AC 90-80B, Approval of Offshore Standard Approach Procedure (OSAP), Airborne Radar Approaches (ARA), and Helicopter En Route Areas (HEDA) Criteria, on the Flight Standards web site **http://www.mmac.jccbi.gov/afs/afs420**. The return flight plan is just the reverse with the requested stand-alone GPS approach contained in the remarks section.

2. The large number (over 300) of waypoints in the grid system makes it difficult to assign phonetically pronounceable names to the waypoints that would be meaningful to pilots and controllers. A unique naming system was adopted that enables pilots and controllers to derive the fix position from the name. The five-letter names are derived as follows:

(a) The waypoints are divided into sets of 3 columns each. A three-letter identifier, identifying a geographical area or a NAVAID to the north, represents each set.

(b) Each column in a set is named after its position, i.e., left (L), center (C), and right (R).

(c) The rows of the grid are named alphabetically from north to south, starting with A for the northern most row.

EXAMPLE-
LCHRC would be pronounced "Lake Charles Romeo Charlie." The waypoint is in the right-hand column of the Lake Charles VOR set, in row C (third south from the northern most row).

3. Since the grid system's implementation, IFR delays (frequently over 1 hour in length) for operations in this environment have been effectively eliminated. The comfort level of the pilots, knowing that they will be given a clearance quickly, plus the mileage savings in this near free-flight environment, is allowing the operators to carry less fuel. Less fuel means they can transport additional passengers, which is a substantial fiscal and operational benefit, considering the limited seating on board helicopters.

4. There are 3 requirements for operators to meet before filing IFR flight plans utilizing the grid:

(a) The helicopter must be IFR certified and equipped with IFR certified TSO C-129 GPS navigational units.

(b) The operator must obtain prior written approval from the appropriate Flight Standards District Office through a Certificate of Authorization or revision to their Operations Specifications, as appropriate.

(c) The operator must be a signatory to the Houston ARTCC Letter of Agreement.

5. FAA/NACO publishes the grid system waypoints on the IFR Gulf of Mexico Vertical Flight Reference Chart. A commercial equivalent is also available. The chart is updated annually and is available from a FAA chart agent or FAA directly, website address: **http://naco.faa.gov**.

e. General Requirements

1. Authorization to conduct any GPS operation under IFR requires that:

(a) GPS navigation equipment used must be approved in accordance with the requirements specified in Technical Standard Order (TSO) C-129, or equivalent, and the

installation must be done in accordance with Advisory Circular AC 20-138, Airworthiness Approval of Global Positioning System (GPS) Navigation Equipment for Use as a VFR and IFR Supplemental Navigation System, or Advisory Circular AC 20-130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors, or equivalent. Equipment approved in accordance with TSO C-115a does not meet the requirements of TSO C-129. Visual flight rules (VFR) and hand-held GPS systems are not authorized for IFR navigation, instrument approaches, or as a principal instrument flight reference. During IFR operations they may be considered only an aid to situational awareness.

(b) Aircraft using GPS navigation equipment under IFR must be equipped with an approved and operational alternate means of navigation appropriate to the flight. Active monitoring of alternative navigation equipment is not required if the GPS receiver uses RAIM for integrity monitoring. Active monitoring of an alternate means of navigation is required when the RAIM capability of the GPS equipment is lost.

(c) Procedures must be established for use in the event that the loss of RAIM capability is predicted to occur. In situations where this is encountered, the flight must rely on other approved equipment, delay departure, or cancel the flight.

(d) The GPS operation must be conducted in accordance with the FAA-approved aircraft flight manual (AFM) or flight manual supplement. Flight crew members must be thoroughly familiar with the particular GPS equipment installed in the aircraft, the receiver operation manual, and the AFM or flight manual supplement. Unlike ILS and VOR, the basic operation, receiver presentation to the pilot, and some capabilities of the equipment can vary greatly. Due to these differences, operation of different brands, or even models of the same brand, of GPS receiver under IFR should not be attempted without thorough study of the operation of that particular receiver and installation. Most receivers have a built-in simulator mode which will allow the pilot to become familiar with operation prior to attempting operation in the aircraft. Using the equipment in flight under VFR conditions prior to attempting IFR operation will allow further familiarization.

(e) Aircraft navigating by IFR approved GPS are considered to be area navigation (RNAV) aircraft and have special equipment suffixes. File the appropriate equipment suffix in accordance with TBL 5-1-2, on the ATC flight plan. If GPS avionics become inoperative, the pilot should advise ATC

and amend the equipment suffix.

(f) Prior to any GPS IFR operation, the pilot must review appropriate NOTAM's and aeronautical information. (See GPS NOTAM's/Aeronautical Information.)

(g) Air carrier and commercial operators must meet the appropriate provisions of their approved operations specifications.

f. Use of GPS for IFR Oceanic, Domestic En Route, and Terminal Area Operations

1. GPS IFR operations in oceanic areas can be conducted as soon as the proper avionics systems are installed, provided all general requirements are met. A GPS installation with TSO C-129 authorization in class A1, A2, B1, B2, C1, or C2 may be used to replace one of the other approved means of long-range navigation, such as dual INS or dual Omega. (See TBL 1-1-7 and TBL 1-1-8.) A single GPS installation with these classes of equipment which provide RAIM for integrity monitoring may also be used on short oceanic routes which have only required one means of long-range navigation.

TBL 1-1-7

GPS IFR Equipment Classes/Categories

TSO-C129						
Equipment Class	**RAIM**	**Int. Nav Sys. to Prov. RAIM Equiv.**	**Oceanic**	**En Route**	**Terminal**	**Nonprecision Approach Capable**
Class A - GPS sensor and navigation capability.						
A1	yes		yes	yes	yes	yes
A2	yes		yes	yes	yes	no
Class B - GPS sensor data to an integrated navigation system (i.e. FMS, multi-sensor navigation system, etc.).						
B1	yes		yes	yes	yes	yes
B2	yes		yes	yes	yes	no
B3		yes	yes	yes	yes	yes
B4		yes	yes	yes	yes	no
Class C - GPS sensor data to an integrated navigation system (as in Class B) which provides enhanced guidance to an autopilot, or flight director, to reduce flight tech. errors. Limited to 14 CFR Part 121 or equivalent criteria.						
C1	yes		yes	yes	yes	yes
C2	yes		yes	yes	yes	no
C3		yes	yes	yes	yes	yes
C4		yes	yes	yes	yes	no

TBL 1-1-8

GPS Approval Required/Authorized Use

Equipment Type[1]	**Installation Approval Required**	**Operational Approval Required**	**IFR En Route**[2]	**IFR Terminal**[2]	**IFR Approach**[3]	**Oceanic Remote**	**In Lieu of ADF and/or DME**[3]
Hand held[4]	X[5]						
VFR Panel Mount[4]	X						
IFR En Route and Terminal	X	X	X	X			X
IFR Oceanic/ Remote	X	X	X	X		X	X
IFR En Route, Terminal, and Approach	X	X	X	X	X		X

NOTE-
[1]To determine equipment approvals and limitations, refer to the AFM, AFM supplements, or pilot guides.
[2]Requires verification of data for correctness if database is expired.
[3]Requires current database.
[4]VFR and hand-held GPS systems are not authorized for IFR navigation, instrument approaches, or as a primary instrument flight reference. During IFR operations they may be considered only an aid to situational awareness.
[5]Hand-held receivers require no approval. However, any aircraft modification to support the hand-held receiver; i.e., installation of an external antenna or a permanent mounting bracket, does require approval.

2. GPS domestic en route and terminal IFR operations can be conducted as soon as proper avionics systems are installed, provided all general requirements are met. The avionics necessary to receive all of the ground-based facilities appropriate for the route to the destination airport and any required alternate airport must be installed and operational. Ground-based facilities necessary for these routes must also be operational.

3. The GPS Approach Overlay Program is an authorization for pilots to use GPS avionics under IFR for flying designated nonprecision instrument approach procedures, except LOC, LDA, and simplified directional facility (SDF) procedures. These procedures are now identified by the name of the procedure and "or GPS" (e.g., VOR/DME or GPS RWY 15). Other previous types of overlays have either been converted to this format or replaced with stand-alone procedures. Only approaches contained in the current onboard navigation database are authorized. The navigation database may contain information about

nonoverlay approach procedures that is intended to be used to enhance position orientation, generally by providing a map, while flying these approaches using conventional NAVAID's. This approach information should not be confused with a GPS overlay approach (see the receiver operating manual, AFM, or AFM Supplement for details on how to identify these approaches in the navigation database).

NOTE-
Overlay approaches are predicated upon the design criteria of the ground-based NAVAID used as the basis of the approach. As such, they do not adhere to the design criteria described in paragraph 5-4-5i, Area Navigation (RNAV) Instrument Approach Charts, for stand-alone GPS approaches.

4. GPS IFR approach operations can be conducted as soon as proper avionics systems are installed and the following requirements are met:

(a) The authorization to use GPS to fly instrument approaches is limited to U.S. airspace.

(b) The use of GPS in any other airspace must be expressly authorized by the FAA Administrator.

(c) GPS instrument approach operations outside the U.S. must be authorized by the appropriate sovereign authority.

5. Subject to the restrictions below, operators in the U.S. NAS are authorized to use GPS equipment certified for IFR operations in place of ADF and/or DME equipment for en route and terminal operations. For some operations there is no requirement for the aircraft to be equipped with an ADF or DME receiver, see subparagraphs f6(g) and (h) below. The ground-based NDB or DME facility may be temporarily out of service during these operations. Charting will not change to support these operations.

(a) Determining the aircraft position over a DME fix. GPS satisfies the 14 CFR Section 91.205(e) requirement for DME at and above 24,000 feet mean sea level (MSL) (FL 240).

(b) Flying a DME arc.

(c) Navigating to/from an NDB/compass locator.

(d) Determining the aircraft position over an NDB/compass locator.

(e) Determining the aircraft position over a fix defined by an NDB/compass locator bearing crossing a VOR/LOC course.

(f) Holding over an NDB/compass locator.

NOTE-
This approval does not alter the conditions and requirements for use of GPS to fly existing nonprecision instrument approach procedures as defined in the GPS approach overlay program.

6. Restrictions

(a) GPS avionics approved for terminal IFR operations may be used in lieu of ADF and/or DME. Included in this approval are both stand-alone and multi-sensor systems actively employing GPS as a sensor. This equipment must be installed in accordance with appropriate airworthiness installation requirements and the provisions of the applicable FAA approved AFM, AFM supplement, or pilot's guide must be met. The required integrity for these operations must be provided by at least en route RAIM, or an equivalent method; i.e., Wide Area Augmentation System (WAAS).

(b) For air carriers and operators for compensation or hire, Principal Operations Inspector (POI) and operations specification approval is required for any use of GPS.

(c) Waypoints, fixes, intersections, and facility locations to be used for these operations must be retrieved from the GPS airborne database. The database must be current. If the required positions cannot be retrieved from the airborne database, the substitution of GPS for ADF and/or DME is not authorized.

(d) The aircraft GPS system must be operated within the guidelines contained in the AFM, AFM supplement, or pilot's guide.

(e) The CDI must be set to terminal sensitivity (normally 1 or 1 $^{1}/_{4}$ NM) when tracking GPS course guidance in the terminal area. This is to ensure that small deviations from course are displayed to the pilot in order to keep the aircraft within the smaller terminal protected areas.

(f) Charted requirements for ADF and/or DME can be met using the GPS system, except for use as the principal instrument approach navigation source.

(g) Procedures must be established for use in the event that GPS integrity outages are predicted or occur (RAIM annunciation). In these situations, the flight must rely on other approved equipment; this may require the aircraft to be equipped with operational NDB and/or DME receivers. Otherwise, the flight must be rerouted, delayed, canceled or

conducted VFR.

(h) A non-GPS approach procedure must exist at the alternate airport when one is required. If the non-GPS approaches on which the pilot must rely require DME or ADF, the aircraft must be equipped with DME or ADF avionics as appropriate.

7. Guidance. The following provides general guidance which is not specific to any particular aircraft GPS system. For specific system guidance refer to the AFM, AFM supplement, pilot's guide, or contact the manufacturer of your system.

(a) To determine the aircraft position over a DME fix:

(1) Verify aircraft GPS system integrity monitoring is functioning properly and indicates satisfactory integrity.

(2) If the fix is identified by a five letter name which is contained in the GPS airborne database, you may select either the named fix as the active GPS waypoint (WP) or the facility establishing the DME fix as the active GPS WP.

NOTE-
When using a facility as the active WP, the only acceptable facility is the DME facility which is charted as the one used to establish the DME fix. If this facility is not in your airborne database, you are not authorized to use a facility WP for this operation.

(3) If the fix is identified by a five letter name which is not contained in the GPS airborne database, or if the fix is not named, you must select the facility establishing the DME fix or another named DME fix as the active GPS WP.

NOTE-
An alternative, until all DME sources are in the database, is using a named DME fix as the active waypoint to identify unnamed DME fixes on the same course and from the same DME source as the active waypoint.

CAUTION-
Pilots should be extremely careful to ensure that correct distance measurements are used when utilizing this interim method. It is strongly recommended that pilots review

distances for DME fixing during preflight preparation.

(4) If you select the named fix as your active GPS WP, you are over the fix when the GPS system indicates you are at the active WP.

(5) If you select the DME providing facility as the active GPS WP, you are over the fix when the GPS distance from the active WP equals the charted DME value and you are on the appropriate bearing or course.

(b) To fly a DME arc:

(1) Verify aircraft GPS system integrity monitoring is functioning properly and indicates satisfactory integrity.

(2) You must select, from the airborne database, the facility providing the DME arc as the active GPS WP.

NOTE-
The only acceptable facility is the DME facility on which the arc is based. If this facility is not in your airborne database, you are not authorized to perform this operation.

(3) Maintain position on the arc by reference to the GPS distance in lieu of a DME readout.

(c) To navigate to or from an NDB/compass locator:

NOTE-
If the chart depicts the compass locator collocated with a fix of the same name, use of that fix as the active WP in place of the compass locator facility is authorized.

(1) Verify aircraft GPS system integrity monitoring is functioning properly and indicates satisfactory integrity.

(2) Select terminal CDI sensitivity in accordance with the AFM, AFM supplement, or pilot's guide if in the terminal area.

(3) Select the NDB/compass locator facility from the airborne database as the active WP.

(4) Select and navigate on the appropriate

course to or from the active WP.

(d) To determine the aircraft position over an NDB/compass locator:

(1) Verify aircraft GPS system integrity monitoring is functioning properly and indicates satisfactory integrity.

(2) Select the NDB/compass locator facility from the airborne database as the active WP.

NOTE-
When using an NDB/compass locator, that facility must be charted and be in the airborne database. If this facility is not in your airborne database, you are not authorized to use a facility WP for this operation.

(3) You are over the NDB/compass locator when the GPS system indicates you are at the active WP.

(e) To determine the aircraft position over a fix made up of an NDB/compass locator bearing crossing a VOR/LOC course:

(1) Verify aircraft GPS system integrity monitoring is functioning properly and indicates satisfactory integrity.

(2) A fix made up by a crossing NDB/compass locator bearing will be identified by a five letter fix name. You may select either the named fix or the NDB/compass locator facility providing the crossing bearing to establish the fix as the active GPS WP.

NOTE-
When using an NDB/compass locator, that facility must be charted and be in the airborne database. If this facility is not in your airborne database, you are not authorized to use a facility WP for this operation.

(3) If you select the named fix as your active GPS WP, you are over the fix when the GPS system indicates you are at the WP as you fly the prescribed track from the non-GPS navigation source.

(4) If you select the NDB/compass locator facility as the active GPS WP, you are over the fix when the GPS bearing to the active WP is the same as the charted NDB/compass locator bearing for the fix as you fly the prescribed track from the non-GPS navigation source.

(f) To hold over an NDB/compass locator:

(1) Verify aircraft GPS system integrity monitoring is functioning properly and indicates satisfactory integrity.

(2) Select terminal CDI sensitivity in accordance with the AFM, AFM supplement, or pilot's guide if in the terminal area.

(3) Select the NDB/compass locator facility from the airborne database as the active WP.

NOTE-
When using a facility as the active WP, the only acceptable facility is the NDB/compass locator facility which is charted. If this facility is not in your airborne database, you are not authorized to use a facility WP for this operation.

(4) Select nonsequencing (e.g. "HOLD" or "OBS") mode and the appropriate course in accordance with the AFM, AFM supplement, or pilot's guide.

(5) Hold using the GPS system in accordance with the AFM, AFM supplement, or pilot's guide.

8. Planning. Good advance planning and intimate knowledge of your navigational systems are vital to safe and successful use of GPS in lieu of ADF and/or DME.

(a) You should plan ahead before using GPS systems as a substitute for ADF and/or DME. You will have several alternatives in selecting waypoints and system configuration. After you are cleared for the approach is not the time to begin programming your GPS. In the flight planning process you should determine whether you will use the equipment in the automatic sequencing mode or in the nonsequencing mode and select the waypoints you will use.

(b) When you are using your aircraft GPS system to supplement other navigation systems, you may need to bring

your GPS control panel into your navigation scan to see the GPS information. Some GPS aircraft installations will present localizer information on the CDI whenever a localizer frequency is tuned, removing the GPS information from the CDI display. Good advance planning and intimate knowledge of your navigation systems are vital to safe and successful use of GPS.

(c) The following are some factors to consider when preparing to install a GPS receiver in an aircraft. Installation of the equipment can determine how easy or how difficult it will be to use the system.

(1) Consideration should be given to installing the receiver within the primary instrument scan to facilitate using the GPS in lieu of ADF and/or DME. This will preclude breaking the primary instrument scan while flying the aircraft and tuning, and identifying waypoints. This becomes increasingly important on approaches, and missed approaches.

(2) Many GPS receivers can drive an ADF type bearing pointer. Such an installation will provide the pilot with an enhanced level of situational awareness by providing GPS navigation information while the CDI is set to VOR or ILS.

(3) The GPS receiver may be installed so that when an ILS frequency is tuned, the navigation display defaults to the VOR/ILS mode, preempting the GPS mode. However, if the receiver installation requires a manual selection from GPS to ILS, it allows the ILS to be tuned and identified while navigating on the GPS. Additionally, this prevents the navigation display from automatically switching back to GPS when a VOR frequency is selected. If the navigation display automatically switches to GPS mode when a VOR is selected, the change may go unnoticed and could result in erroneous navigation and departing obstruction protected airspace.

(4) GPS is a supplemental navigation system in part due to signal availability. There will be times when your system will not receive enough satellites with proper geometry to provide accurate positioning or sufficient integrity. Procedures should be established by the pilot in the event that GPS outages occur. In these

situations, the pilot should rely on other approved equipment, delay departure, reroute, or discontinue IFR operations.

g. Equipment and Database Requirements

1. Authorization to fly approaches under IFR using GPS avionics systems requires that:

(a) A pilot use GPS avionics with TSO C-129, or equivalent, authorization in class A1, B1, B3, C1, or C3; and

(b) All approach procedures to be flown must be retrievable from the current airborne navigation database supplied by the TSO C-129 equipment manufacturer or other FAA approved source.

h. GPS Approach Procedures

As the production of stand-alone GPS approaches has progressed, many of the original overlay approaches have been replaced with stand-alone procedures specifically designed for use by GPS systems. The title of the remaining GPS overlay procedures has been revised on the approach chart to "or GPS" (e.g., VOR or GPS RWY 24). Therefore, all the approaches that can be used by GPS now contain "GPS" in the title (e.g., "VOR or GPS RWY 24," "GPS RWY 24," or "RNAV (GPS) RWY 24"). During these GPS approaches, underlying ground-based NAVAID's are not required to be operational and associated aircraft avionics need not be installed, operational, turned on or monitored (monitoring of the underlying approach is suggested when equipment is available and functional). Existing overlay approaches may be requested using the GPS title, such as "GPS RWY 24" for the VOR or GPS RWY 24.

NOTE-
Any required alternate airport must have an approved instrument approach procedure other than GPS that is anticipated to be operational and available at the estimated time of arrival, and which the aircraft is equipped to fly.

i. GPS NOTAM's/Aeronautical Information

1. GPS satellite outages are issued as GPS NOTAM's both domestically and internationally. However, the effect of an outage on the intended operation cannot be determined unless the pilot has a RAIM availability prediction program which allows excluding a satellite which is predicted to be out of service based on the NOTAM information.

2. Civilian pilots may obtain GPS RAIM availability information for nonprecision approach procedures by specifically requesting GPS aeronautical information from an Automated Flight Service Station during preflight briefings. GPS RAIM aeronautical information can be obtained for a period of 3 hours (ETA hour and 1 hour before to 1 hour after the ETA hour) or a 24 hour time frame at a particular airport. FAA

briefers will provide RAIM information for a period of 1 hour before to 1 hour after the ETA, unless a specific time frame is requested by the pilot. If flying a published GPS departure, a RAIM prediction should also be requested for the departure airport.

3. The military provides airfield specific GPS RAIM NOTAM's for nonprecision approach procedures at military airfields. The RAIM outages are issued as M-series NOTAM's and may be obtained for up to 24 hours from the time of request.

j. Receiver Autonomous Integrity Monitoring (RAIM)

1. RAIM outages may occur due to an insufficient number of satellites or due to unsuitable satellite geometry which causes the error in the position solution to become too large. Loss of satellite reception and RAIM warnings may occur due to aircraft dynamics (changes in pitch or bank angle). Antenna location on the aircraft, satellite position relative to the horizon, and aircraft attitude may affect reception of one or more satellites. Since the relative positions of the satellites are constantly changing, prior experience with the airport does not guarantee reception at all times, and RAIM availability should always be checked.

2. If RAIM is not available, another type of navigation and approach system must be used, another destination selected, or the trip delayed until RAIM is predicted to be available on arrival. On longer flights, pilots should consider rechecking the RAIM prediction for the destination during the flight. This may provide early indications that an unscheduled satellite outage has occurred since takeoff.

3. If a RAIM failure/status annunciation occurs prior to the final approach waypoint (FAWP), the approach should not be completed since GPS may no longer provide the required accuracy. The receiver performs a RAIM prediction by 2 NM prior to the FAWP to ensure that RAIM is available at the FAWP as a condition for entering the approach mode. **The pilot should ensure that the receiver has sequenced from "Armed" to "Approach" prior to the FAWP** (normally occurs 2 NM prior). Failure to sequence may be an indication of the detection of a satellite anomaly, failure to arm the receiver (if required), or other problems which preclude completing the approach.

4. If the receiver does not sequence into the approach mode or a RAIM failure/status annunciation occurs prior to the FAWP, the pilot should not descend to Minimum Descent Altitude (MDA), but should proceed to the missed approach waypoint (MAWP) via the FAWP, perform a missed approach, and contact ATC as soon as practical. Refer to the receiver operating manual for specific indications and instructions associated with loss of RAIM prior to the FAF.

5. If a RAIM failure occurs after the FAWP, the receiver is allowed to continue operating without an annunciation for up to 5 minutes to allow completion of the approach (see receiver operating manual). **If the**

RAIM flag/status annunciation appears after the FAWP, the missed approach should be executed immediately.

k. Waypoints

1. GPS approaches make use of both fly-over and fly-by waypoints. Fly-by waypoints are used when an aircraft should begin a turn to the next course prior to reaching the waypoint separating the two route segments. This is known as turn anticipation and is compensated for in the airspace and terrain clearances. Approach waypoints, except for the MAWP and the missed approach holding waypoint (MAHWP), are normally fly-by waypoints. Fly-over waypoints are used when the aircraft must fly over the point prior to starting a turn. New approach charts depict fly-over waypoints as a circled waypoint symbol. Overlay approach charts and some early stand alone GPS approach charts may not reflect this convention.

2. Since GPS receivers are basically "To-To" navigators, they must always be navigating to a defined point. On overlay approaches, if no pronounceable five-character name is published for an approach waypoint or fix, it was given a database identifier consisting of letters and numbers. These points will appear in the list of waypoints in the approach procedure database, but may not appear on the approach chart. A point used for the purpose of defining the navigation track for an airborne computer system (i.e., GPS or FMS) is called a Computer Navigation Fix (CNF). CNF's include unnamed DME fixes, beginning and ending points of DME arcs and sensor final approach fixes (FAF's) on some GPS overlay approaches. To aid in the approach chart/database correlation process, the FAA has begun a program to assign five-letter names to CNF's and to chart CNF's on various National Oceanic Service aeronautical products. These CNF's are not to be used for any air traffic control (ATC) application, such as holding for which the fix has not already been assessed. CNF's will be charted to distinguish them from conventional reporting points, fixes, intersections, and waypoints. The CNF name will be enclosed in parenthesis, e.g., (MABEE), and the name will be placed next to the CNF it defines. If the CNF is not at an existing point defined by means such as crossing radials or radial/DME, the point will be indicated by an "X." The CNF name will not be used in filing a flight plan or in aircraft/ATC communications. Use current phraseology, e.g., facility name, radial, distance, to describe these fixes.

3. Unnamed waypoints in the database will be uniquely identified for each airport but may be repeated for another airport (e.g., RW36 will be used at each airport with a runway 36 but will be at the same location for all approaches at a given airport).

4. The runway threshold waypoint, which is normally the MAWP, may have a five letter identifier (e.g., SNEEZ) or be coded as RW## (e.g., RW36, RW36L). Those thresholds which are coded as five letter identifiers are being changed to the RW## designation. This may cause the approach chart and database to differ until all changes are complete. The runway threshold waypoint is also used as the center of the

Minimum Safe Altitude (MSA) on most GPS approaches. MAWP's not located at the threshold will have a five letter identifier.

l. Position Orientation

As with most RNAV systems, pilots should pay particular attention to position orientation while using GPS. Distance and track information are provided to the next active waypoint, not to a fixed navigation aid. Receivers may sequence when the pilot is not flying along an active route, such as when being vectored or deviating for weather, due to the proximity to another waypoint in the route. This can be prevented by placing the receiver in the nonsequencing mode. When the receiver is in the nonsequencing mode, bearing and distance are provided to the selected waypoint and the receiver will not sequence to the next waypoint in the route until placed back in the auto sequence mode or the pilot selects a different waypoint. On overlay approaches, the pilot may have to compute the along track distance to stepdown fixes and other points due to the receiver showing along track distance to the next waypoint rather than DME to the VOR or ILS ground station.

m. Conventional Versus GPS Navigation Data

There may be slight differences between the heading information portrayed on navigational charts and the GPS navigation display when flying an overlay approach or along an airway. All magnetic tracks defined by a VOR radial are determined by the application of magnetic variation at the VOR; however, GPS operations may use an algorithm to apply the magnetic variation at the current position, which may produce small differences in the displayed course. Both operations should produce the same desired ground track. Due to the use of great circle courses, and the variations in magnetic variation, the bearing to the next waypoint and the course from the last waypoint (if available) may not be exactly 180° apart when long distances are involved. Variations in distances will occur since GPS distance-to-waypoint values are along track (straight-line) distances (ATD) computed to the next waypoint and the DME values published on underlying procedures are slant range distances measured to the station. This difference increases with aircraft altitude and proximity to the NAVAID.

n. Departures and Instrument Departure Procedures (DP's)

The GPS receiver must be set to terminal (±1 NM) CDI sensitivity and the navigation routes contained in the database in order to fly published IFR charted departures and DP's. Terminal RAIM should be automatically provided by the receiver. (Terminal RAIM for departure may not be available unless the waypoints are part of the active flight plan rather than proceeding direct to the first destination.) Certain segments of a DP may require some manual intervention by the pilot, especially when radar vectored to a course or required to intercept a specific course to a waypoint. The database may not contain all of the transitions or departures from all runways and some GPS receivers do not contain DP's in the database. It is necessary that helicopter procedures be flown at 70 knots or less since helicopter departure procedures and missed approaches use a 20:1 obstacle clearance surface (OCS), which is double the fixed-wing OCS, and turning areas are based on this speed as well.

o. Flying GPS Approaches

1. Determining which area of the TAA the aircraft will enter when flying a "T" with a TAA must be accomplished using the bearing and distance to the IF(IAF). This is most critical when entering the TAA in the vicinity of the extended runway centerline and determining whether you will be entering the right or left base area. Once inside the TAA, all sectors and stepdowns are based on the bearing and distance to the IAF for that area, which the aircraft should be proceeding direct to at that time, unless on vectors. (See FIG 5-4-3 and FIG 5-4-4.)

2. Pilots should fly the full approach from an Initial Approach Waypoint (IAWP) or feeder fix unless specifically cleared otherwise. Randomly joining an approach at an intermediate fix does not assure terrain clearance.

3. When an approach has been loaded in the flight plan, GPS receivers will give an "arm" annunciation 30 NM straight line distance from the airport/heliport reference point. Pilots should arm the approach mode at this time, if it has not already been armed (some receivers arm automatically). Without arming, the receiver will not change from en route CDI and RAIM sensitivity of ±5 NM either side of centerline to ±1 NM terminal sensitivity. Where the IAWP is inside this 30 mile point, a CDI sensitivity change will occur once the approach mode is armed and the aircraft is inside 30 NM. Where the IAWP is beyond 30 NM from the airport/heliport reference point, CDI sensitivity will not change until the aircraft is within 30 miles of the airport/heliport reference point even if the approach is armed earlier. Feeder route obstacle clearance is predicated on the receiver being in terminal (±1 NM) CDI sensitivity and RAIM within 30 NM of the airport/heliport reference point, therefore, the receiver should always be armed (if required) not later than the 30 NM annunciation.

4. The pilot must be aware of what bank angle/turn rate the particular receiver uses to compute turn anticipation, and whether wind and airspeed are included in the receiver's calculations. This information should be in the receiver operating manual. Over or under banking the turn onto the final approach course may significantly delay getting on course and may result in high descent rates to achieve the next segment altitude.

5. When within 2 NM of the FAWP with the approach mode armed, the approach mode will switch to active, which results in RAIM changing to approach sensitivity and a change in CDI sensitivity. Beginning 2 NM prior to the FAWP, the full scale CDI sensitivity will smoothly change from ±1 NM to ±0.3 NM at the FAWP. As sensitivity changes from ±1 NM to ±0.3 NM approaching the FAWP, with the CDI not centered, the corresponding increase in CDI displacement may give the impression that the aircraft is moving further away from the intended course even though it is on an acceptable intercept heading. Referencing the digital track displacement information (cross track error), if it is available in the approach mode, may help the pilot remain position oriented in this

situation. Being established on the final approach course prior to the beginning of the sensitivity change at 2 NM will help prevent problems in interpreting the CDI display during ramp down. Therefore, requesting or accepting vectors which will cause the aircraft to intercept the final approach course within 2 NM of the FAWP is not recommended.

6. When receiving vectors to final, most receiver operating manuals suggest placing the receiver in the nonsequencing mode on the FAWP and manually setting the course. This provides an extended final approach course in cases where the aircraft is vectored onto the final approach course outside of any existing segment which is aligned with the runway. Assigned altitudes must be maintained until established on a published segment of the approach. Required altitudes at waypoints outside the FAWP or stepdown fixes must be considered. Calculating the distance to the FAWP may be required in order to descend at the proper location.

7. Overriding an automatically selected sensitivity during an approach will cancel the approach mode annunciation. If the approach mode is not armed by 2 NM prior to the FAWP, the approach mode will not become active at 2 NM prior to the FAWP, and the equipment will flag. In these conditions, the RAIM and CDI sensitivity will not ramp down, and the pilot should not descend to MDA, but fly to the MAWP and execute a missed approach. The approach active annunciator and/or the receiver should be checked to ensure the approach mode is active prior to the FAWP.

8. Do not attempt to fly an approach unless the procedure is contained in the current, on-board navigation database and identified as "GPS" on the approach chart. The navigation database may contain information about nonoverlay approach procedures that is intended to be used to enhance position orientation, generally by providing a map, while flying these approaches using conventional NAVAID's. This approach information should not be confused with a GPS overlay approach (see the receiver operating manual, AFM, or AFM Supplement for details on how to identify these procedures in the navigation database). Flying point to point on the approach does not assure compliance with the published approach procedure. The proper RAIM sensitivity will not be available and the CDI sensitivity will not automatically change to ±0.3 NM. Manually setting CDI sensitivity does not automatically change the RAIM sensitivity on some receivers. Some existing nonprecision approach procedures cannot be coded for use with GPS and will not be available as overlays.

9. Pilots should pay particular attention to the exact operation of their GPS receivers for performing holding patterns and in the case of overlay approaches, operations such as procedure turns. These procedures may require manual intervention by the pilot to stop the sequencing of waypoints by the receiver and to resume automatic GPS navigation sequencing once the maneuver is complete. The same waypoint may appear in the route of flight more than once consecutively (e.g., IAWP, FAWP, MAHWP on a procedure turn). Care must be exercised to ensure

that the receiver is sequenced to the appropriate waypoint for the segment of the procedure being flown, especially if one or more fly-overs are skipped (e.g., FAWP rather than IAWP if the procedure turn is not flown). The pilot may have to sequence past one or more fly-overs of the same waypoint in order to start GPS automatic sequencing at the proper place in the sequence of waypoints.

10. Incorrect inputs into the GPS receiver are especially critical during approaches. In some cases, an incorrect entry can cause the receiver to leave the approach mode.

11. A fix on an overlay approach identified by a DME fix will not be in the waypoint sequence on the GPS receiver unless there is a published name assigned to it. When a name is assigned, the along track to the waypoint may be zero rather than the DME stated on the approach chart. The pilot should be alert for this on any overlay procedure where the original approach used DME.

12. If a visual descent point (VDP) is published, it will not be included in the sequence of waypoints. Pilots are expected to use normal piloting techniques for beginning the visual descent, such as ATD.

13. Unnamed stepdown fixes in the final approach segment will not be coded in the waypoint sequence of the aircraft's navigation database and must be identified using ATD. Stepdown fixes in the final approach segment of RNAV (GPS) approaches are being named, in addition to being identified by ATD. However, since most GPS avionics do not accommodate waypoints between the FAF and MAP, even when the waypoint is named, the waypoints for these stepdown fixes may not appear in the sequence of waypoints in the navigation database. Pilots must continue to identify these stepdown fixes using ATD.

p. Missed Approach

1. A GPS missed approach requires pilot action to sequence the receiver past the MAWP to the missed approach portion of the procedure. The pilot must be thoroughly familiar with the activation procedure for the particular GPS receiver installed in the aircraft and must **initiate appropriate action after the MAWP.** Activating the missed approach prior to the MAWP will cause CDI sensitivity to immediately change to terminal (±1NM) sensitivity and the receiver will continue to navigate to the MAWP. The receiver will not sequence past the MAWP. Turns should not begin prior to the MAWP. If the missed approach is not activated, the GPS receiver will display an extension of the inbound final approach course and the ATD will increase from the MAWP until it is manually sequenced after crossing the MAWP.

2. Missed approach routings in which the first track is via a course rather than direct to the next waypoint **require additional action by the pilot** to set the course. Being familiar with all of the inputs required is especially critical during this phase of flight.

q. GPS Familiarization

Pilots should practice GPS approaches under visual meteorological conditions (VMC) until thoroughly proficient with all aspects of their equipment (receiver and installation) prior to attempting flight by IFR in instrument meteorological conditions (IMC). Some of the areas which the pilot should practice are:

1. Utilizing the receiver autonomous integrity monitoring (RAIM) prediction function;

2. Inserting a DP into the flight plan, including setting terminal CDI sensitivity, if required, and the conditions under which terminal RAIM is available for departure (some receivers are not DP or STAR capable);

3. Programming the destination airport;

4. Programming and flying the overlay approaches (especially procedure turns and arcs);

5. Changing to another approach after selecting an approach;

6. Programming and flying "direct" missed approaches;

7. Programming and flying "routed" missed approaches;

8. Entering, flying, and exiting holding patterns, particularly on overlay approaches with a second waypoint in the holding pattern;

9. Programming and flying a "route" from a holding pattern;

10. Programming and flying an approach with radar vectors to the intermediate segment;

11. Indication of the actions required for RAIM failure both before and after the FAWP; and

12. Programming a radial and distance from a VOR (often used in departure instructions).

1-1-22. Wide Area Augmentation System (WAAS)

a. The WAAS will allow GPS to be used, as for aviation navigation, from takeoff through Category I precision approach. WAAS is a critical component of the FAA's strategic objective for a seamless satellite navigation system for civil aviation. This system will improve the accuracy, availability, and integrity currently provided by GPS, thereby improving capacity and safety.

b. Unlike traditional ground-based navigation aids, the WAAS will cover a more extensive service area. Wide-area ground reference stations (WRS) will be linked to form a U.S. WAAS network. Signals from GPS

satellites are received by these precisely surveyed ground reference stations and any errors in the signals are then determined. Each station in the network relays the data to a wide-area master station (WMS) where correction information for specific geographical areas is computed. A correction message is prepared and uplinked to a geostationary satellite (GEO) via a ground uplink station (GUS). The message is then broadcast on the same frequency as GPS (L1, 1575.42 MHz) to WAAS receivers within the broadcast coverage area of the WAAS. Other modes of transportation will also benefit from the increased accuracy, availability, and integrity that WAAS will deliver. The WAAS broadcast message improves the GPS 95 percent signal accuracy from 100 meters to approximately 7 meters.

c. Planned expansion of the U.S. ground-station network will include Canada, Iceland, Mexico, and Panama, and has the potential to expand to other countries as well. Additionally, Japan and Europe are building similar systems that are planned to be interoperable with the U.S. WAAS. The merging of these systems will create a worldwide seamless navigation capability similar to GPS, but with greater accuracy, availability and integrity.

d. Additionally, the FAA is very involved in the International Civil Aviation Organization's (ICAO) Global Navigation Satellite System Panel (GNSSP) which supports the development of standards and procedures for satellite navigation for civil aviation applications worldwide.

e. As of June 4, 1998, the WAAS site installation of 25 WRS's, 2 WMS's, 4 GUS's, and the required terrestrial communications to support the WAAS network were completed. Prior to the commissioning of the WAAS for public use, the FAA will conduct a series of activities including developmental testing and evaluation and operational testing and evaluation of the system. Enhancements to the initial phase of WAAS will include additional master and reference stations and communication satellites, as needed. At initial deployment, the WAAS will not provide Category I approach capability at every runway in the U.S. National Airspace System (NAS). The final system, however, is designed to satisfy en route through Category I precision approach navigation performance requirements for using WAAS as the only radio navigation aid. When the final WAAS configuration is in place, it will provide pilots with en route navigation and vertical guidance for instrument approaches throughout the NAS.

1-1-23. GNSS Landing System (GLS)

a. General

1. The GLS provides precision navigation guidance for exact alignment and descent of aircraft on approach to a runway. It provides differential augmentation to the Global Navigation Satellite System (GNSS).

2. The U.S. plans to provide augmentation services to the GPS for the first phase of GNSS. This section will be revised and updated to reflect international standards and GLS services as they are provided.

1-1-24. Precision Approach Systems other than ILS, GLS, and MLS

a. General

Approval and use of precision approach systems other than ILS, GLS and MLS require the issuance of special instrument approach procedures.

b. Special Instrument Approach Procedure

1. Special instrument approach procedures must be issued to the aircraft operator if pilot training, aircraft equipment, and/or aircraft performance is different than published procedures. Special instrument approach procedures are not distributed for general public use. These procedures are issued to an aircraft operator when the conditions for operations approval are satisfied.

2. General aviation operators requesting approval for special procedures should contact the local Flight Standards District Office to obtain a letter of authorization. Air carrier operators requesting approval for use of special procedures should contact their Certificate Holding District Office for authorization through their Operations Specification.

c. Transponder Landing System (TLS)

1. The TLS is designed to provide approach guidance utilizing existing airborne ILS localizer, glide slope, and transponder equipment.

2. Ground equipment consists of a transponder interrogator, sensor arrays to detect lateral and vertical position, and ILS frequency transmitters. The TLS detects the aircraft's position by interrogating its transponder. It then broadcasts ILS frequency signals to guide the aircraft along the desired approach path.

3. TLS instrument approach procedures are designated Special Instrument Approach Procedures. Special aircrew training is required. TLS ground equipment provides approach guidance for only one aircraft at a time. Even though the TLS signal is received using the ILS receiver, no fixed course or glidepath is generated. The concept of operation is very similar to an air traffic controller providing radar vectors, and just as with radar vectors, the guidance is valid only for the intended aircraft. The TLS ground equipment tracks one aircraft, based on its transponder code, and provides correction signals to course and glidepath based on the position of the tracked aircraft. Flying the TLS corrections computed for another aircraft will not provide guidance relative to the approach; therefore, aircrews must not use the TLS signal for navigation unless they have received approach clearance and completed the required coordination with the TLS ground equipment operator. Navigation fixes

based on conventional NAVAID's or GPS are provided in the special instrument approach procedure to allow aircrews to verify the TLS guidance.

d. Special Category I Differential GPS (SCAT-I DGPS)

1. The SCAT-I DGPS is designed to provide approach guidance by broadcasting differential correction to GPS.

2. SCAT-I DGPS procedures require aircraft equipment and pilot training.

3. Ground equipment consists of GPS receivers and a VHF digital radio transmitter. The SCAT-I DGPS detects the position of GPS satellites relative to GPS receiver equipment and broadcasts differential corrections over the VHF digital radio.

4. Category I Ground Based Augmentation System (GBAS) will displace SCAT-I DGPS as the public use service.

REFERENCE-
AIM, Instrument Approach Procedures, Paragraph 5-4-7f.

1-1-25. Area Navigation

a. General

Area Navigation (RNAV) provides enhanced navigational capability to the pilot. RNAV equipment can compute the airplane position, actual track and ground speed and then provide meaningful information relative to a route of flight selected by the pilot. Typical equipment will provide the pilot with distance, time, bearing and crosstrack error relative to the selected "TO" or "active" waypoint and the selected route. Several navigational systems with different navigational performance characteristics are capable of providing area navigational functions. Present day RNAV includes INS, LORAN, VOR/DME, and GPS systems. Modern multi-sensor systems can integrate one or more of the above systems to provide a more accurate and reliable navigational system. Due to the different levels of performance, area navigational capabilities can satisfy different levels of required navigation performance (RNP).

b. RNAV Operations Incorporating RNP

1. During the past four decades domestic and international air navigation has been conducted using a system of airways and instrument procedures based upon ground-based navigational systems such as NDB, VOR, and ILS. Reliance on ground-based navigational systems has served the aviation community well, but often results in less than optimal routes or instrument procedures and an inefficient use of airspace. With the widespread deployment of RNAV systems and the advent of GPS-based navigation, greater flexibility in defining routes, procedures, and airspace design is now possible with an associated increase in flight safety. To capitalize on the potential of RNAV systems, both the FAA and

International Civil Aviation Organization (ICAO) are affecting a shift toward a new standard of navigation and airspace management called RNP.

2. Navigational systems are typically described as being sensor specific, such as a VOR or ILS system. By specifying airspace requirements as RNP, various navigation systems or combination of systems may be used as long as the aircraft can achieve the RNP. RNP is intended to provide a single performance standard that can be used and applied by aircraft and aircraft equipment manufacturers, airspace planners, aircraft certification and operations, pilots and controllers, and international aviation authorities. RNP can be applied to obstacle clearance or aircraft separation requirements to ensure a consistent application level.

3. ICAO has defined RNP values for the four typical navigation phases of flight: oceanic, en route, terminal and approach. The RNP applicable to a selected airspace, route, procedure is designated by it's **RNP Level or Type**. As defined in the Pilot/Controller Glossary (P/CG), the RNP Level or Type is a value typically expressed as a distance, in nautical miles, from the procedure, route or path within which an aircraft would typically operate. RNP applications also provide performance to protect against larger errors at some multiple of RNP level (e.g., twice the RNP level).

c. Standard RNP Levels

U.S. standard values supporting typical RNP airspace are as specified in TBL 1-1-9 below. Other RNP levels as identified by ICAO, other states and the FAA may also be used.

TBL 1-1-9

U.S. Standard RNP Levels

RNP Level	Typical Application
.3	Approach
1	Departure, Terminal
2	En Route

1. Application of Standard RNP Levels. U.S. Standard Levels of RNP typically used for various routes and procedures supporting RNAV operations may be based on use of a specific navigational system or sensor such as GPS, or on multi-sensor RNAV systems having suitable performance. New RNAV routes and procedures will be FAA's first public use procedures to include a specified RNP level. These procedures are being developed based on earth referenced navigation and do not rely on conventional ground-based navigational aids. Unless otherwise noted on affected charts or procedures, depiction of a specified RNP level will not preclude the use of other airborne RNAV navigational systems.

2. **Depiction of Standard RNP Levels.** The applicable RNP level will be depicted on affected charts and procedures. For example, an RNAV departure procedure may contain a notation referring to eligible aircraft by equipment suffix and a phrase "or RNP-1.0." A typical RNAV approach procedure may include a notation referring to eligible aircraft by specific navigation sensor(s), equipment suffix and a phrase "or RNP-0.3." Specific guidelines for the depiction of RNP levels will be provided through chart bulletins and accompany affected charting changes.

d. Aircraft and Airborne Equipment Eligibility for RNP Operations. Aircraft meeting RNP criteria will have an appropriate entry including special conditions and limitations, if any, in its Aircraft/Rotorcraft Flight Manual (AFM), or supplement. RNAV installations with AFM-RNP certification based on GPS or systems integrating GPS are considered to meet U.S. standard RNP levels for all phases of flight. Aircraft with AFM-RNP certification without GPS may be limited to certain RNP levels, or phases of flight. For example, RNP based on DME/DME without other augmentation may not be appropriate for phases of flight outside the certified DME service volume. Operators of aircraft not having specific AFM-RNP certification may be issued operational approval including special conditions and limitations, if any, for specific RNP levels. Aircraft navigation systems eligible for RNP airspace will be indicated on charts, or announced through other FAA media such as NOTAM's and chart bulletins.

e. Understanding RNP Operations. Pilots should have a clear understanding of the aircraft requirements for operation in a given RNP environment, and advise ATC if an equipment failure or other malfunction causes the aircraft to lose its ability to continue operating in the designated RNP airspace. When a pilot determines a specified RNP level cannot be achieved, he/she should be prepared to revise the route, or delay the operation until appropriate RNP level can be ensured. Some airborne systems use terms other than RNP to indicate the current level of performance. Depending on the airborne system implementation, this may be displayed, and referred to, as actual navigation performance (ANP), estimate of position error (EPE), or other.

f. Other RNP Applications Outside the U.S. The FAA, in cooperation with ICAO member states has led initiatives in implementing the RNP concept to oceanic operations. For example, RNP-10 routes have been established in the northern Pacific (NOPAC) which has increased capacity and efficiency by reducing the distance between tracks to 50 NM. Additionally, the FAA has assisted those U.S. air carriers operating in Europe where the routes have been designated as RNP-5. TBL 1-1-10 below, shows examples of current and future RNP levels of airspace.

TBL 1-1-10

RNP Levels Supported for International Operations

RNP Level	Typical Application
4	Projected for oceanic/remote areas where 30 NM horizontal separation is applied
5	European Basic RNAV (B-RNAV)
10	Oceanic/remote areas where 50 NM horizontal separation is applied

Chapter 4. Air Traffic Control

Section 1. Services Available to Pilots

4-1-1. Air Route Traffic Control Centers

Centers are established primarily to provide air traffic service to aircraft operating on IFR flight plans within controlled airspace, and principally during the en route phase of flight.

4-1-2. Control Towers

Towers have been established to provide for a safe, orderly and expeditious flow of traffic on and in the vicinity of an airport. When the responsibility has been so delegated, towers also provide for the separation of IFR aircraft in the terminal areas.

REFERENCE-

AIM, Approach Control, Paragraph 5-4-3.

4-1-3. Flight Service Stations

a. Flight Service Stations (FSS's) are air traffic facilities which provide pilot briefings, en route communications and VFR search and rescue services, assist lost aircraft and aircraft in emergency situations, relay ATC clearances, originate Notices to Airmen, broadcast aviation weather and National Airspace System (NAS) information, receive and process IFR flight plans, and monitor navigational aids (NAVAID's). In addition, at selected locations FSS's provide En Route Flight Advisory Service (Flight Watch), take weather observations, issue airport advisories, and advise Customs and Immigration of transborder flights.

b. Supplemental Weather Service Locations (SWSL's) are airport facilities staffed with contract personnel who take weather observations and provide current local weather to pilots via telephone or radio. All other services are provided by the parent FSS.

4-1-4. Recording and Monitoring

a. Calls to air traffic control (ATC) facilities (ARTCC's, Towers, FSS's, Central Flow, and Operations Centers) over radio and ATC operational telephone lines (lines used for operational purposes such as controller instructions, briefings, opening and closing flight plans, issuance of IFR clearances and amendments, counter hijacking activities, etc.) may be monitored and recorded for operational uses such as accident investigations, accident prevention, search and rescue purposes, specialist training and evaluation, and technical evaluation and repair of control and communications systems.

b. Where the public access telephone is recorded, a beeper tone is not required. In place of the "beep" tone the FCC has substituted a mandatory requirement that persons to be recorded be given notice they are to be recorded and give consent. Notice is given by this entry, consent to record is assumed by the

individual placing a call to the operational facility.

4-1-5. Communications Release of IFR Aircraft Landing at an Airport Without an Operating Control Tower

Aircraft operating on an IFR flight plan, landing at an airport without an operating control tower will be advised to change to the airport advisory frequency when direct communications with ATC are no longer required. Towers and centers do not have nontower airport traffic and runway in use information. The instrument approach may not be aligned with the runway in use; therefore, if the information has not already been obtained, pilots should make an expeditious change to the airport advisory frequency when authorized.

REFERENCE-
AIM, Advance Information on Instrument Approach, Paragraph 5-4-4.

4-1-6. Pilot Visits to Air Traffic Facilities

Pilots are encouraged to visit air traffic facilities (Towers, Centers and FSS's) and familiarize themselves with the ATC system. On rare occasions, facilities may not be able to approve a visit because of ATC workload or other reasons. It is, therefore, requested that pilots contact the facility prior to the visit and advise of the number of persons in the group, the time and date of the proposed visit and the primary interest of the group. With this information available, the facility can prepare an itinerary and have someone available to guide the group through the facility.

4-1-7. Operation Take-off and Operation Raincheck

Operation Take-off is a program that educates pilots in how best to utilize the FSS modernization efforts and services available in Automated Flight Service Stations (AFSS), as stated in FAA Order 7230.17, Pilot Education Program - Operation Takeoff. Operation Raincheck is a program designed to familiarize pilots with the ATC system, its functions, responsibilities and benefits.

4-1-8. Approach Control Service for VFR Arriving Aircraft

a. Numerous approach control facilities have established programs for arriving VFR aircraft to contact approach control for landing information. This information includes: wind, runway, and altimeter setting at the airport of intended landing. This information may be omitted if contained in the Automatic Terminal Information Service (ATIS) broadcast and the pilot states the appropriate ATIS code.

NOTE-
Pilot use of "have numbers" does not indicate receipt of the ATIS broadcast. In addition, the controller will provide traffic advisories on a workload permitting basis.

b. Such information will be furnished upon initial contact with concerned approach control facility. The pilot will be requested to change to the *tower* frequency at a predetermined time or point, to receive further landing information.

c. Where available, use of this procedure will not hinder the operation of VFR flights by requiring excessive spacing between aircraft or devious routing.

d. Compliance with this procedure is not mandatory but pilot participation is encouraged.

REFERENCE-
AIM, Terminal Radar Services for VFR Aircraft, Paragraph 4-1-17.

NOTE-
Approach control services for VFR aircraft are normally dependent on ATC radar. These services are not available during periods of a radar outage. Approach control services for VFR aircraft are limited when CENRAP is in use.

4-1-9. Traffic Advisory Practices at Airports Without Operating Control Towers
(See TBL 4-1-1.)

a. Airport Operations Without Operating Control Tower

1. There is no substitute for alertness while in the vicinity of an airport. It is essential that pilots be alert and look for other traffic and exchange traffic information when approaching or departing an airport without an operating control tower. This is of particular importance since other aircraft may not have communication capability or, in some cases, pilots may not communicate their presence or intentions when operating into or out of such airports. To achieve the greatest degree of safety, it is essential that all radio-equipped aircraft transmit/receive on a common frequency identified for the purpose of airport advisories.

2. An airport may have a full or part-time tower or FSS located on the airport, a full or part-time UNICOM station or no aeronautical station at all. There are three ways for pilots to communicate their intention and obtain airport/traffic information when operating at an airport that does not have an operating tower: by communicating with an FSS, a UNICOM operator, or by making a self-announce broadcast.

3. Many airports are now providing completely automated weather, radio check capability and airport advisory information on an automated UNICOM system. These systems offer a variety of features, typically selectable by microphone clicks, on the UNICOM frequency. Availability of the automated UNICOM will be published in the Airport/Facility Directory and approach charts.

b. Communicating on a Common Frequency

1. The key to communicating at an airport without an operating control tower is selection of the correct common frequency. The acronym CTAF which stands for Common Traffic Advisory Frequency, is synonymous with this program. A CTAF is a

frequency designated for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating control tower. The CTAF may be a UNICOM, MULTICOM, FSS, or tower frequency and is identified in appropriate aeronautical publications.

TBL 4-1-1

Summary of Recommended Communication Procedures

			Communication/Broadcast Procedures		
	Facility at Airport	**Frequency Use**	**Outbound**	**Inbound**	**Practice Instrument Approach**
1.	UNICOM (No Tower or FSS)	Communicate with UNICOM station on published CTAF frequency (122.7; 122.8; 122.725; 122.975; or 123.0). If unable to contact UNICOM station, use self-announce procedures on CTAF.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	
2.	No Tower, FSS, or UNICOM	Self-announce on MULTICOM frequency 122.9.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	Departing final approach fix (name) or on final approach segment inbound.
3.	No Tower in operation, FSS open	Communicate with FSS on CTAF frequency.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	Approach completed/ terminated.
4.	FSS Closed (No Tower)	Self-announce on CTAF.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	
5.	Tower or FSS not in operation	Self-announce on CTAF.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	

2. The CTAF frequency for a particular airport is contained in the A/FD, Alaska Supplement, Alaska Terminal Publication, Instrument Approach Procedure Charts, and Instrument Departure Procedure (DP) Charts. Also, the CTAF frequency can be obtained by contacting any FSS. Use of the appropriate CTAF, combined with a visual alertness and application of the following recommended good operating practices, will enhance safety of

flight into and out of all uncontrolled airports.

c. Recommended Traffic Advisory Practices

1. Pilots of inbound traffic should monitor and communicate as appropriate on the designated CTAF from 10 miles to landing. Pilots of departing aircraft should monitor/communicate on the appropriate frequency from start-up, during taxi, and until 10 miles from the airport unless the CFR's or local procedures require otherwise.

2. Pilots of aircraft conducting other than arriving or departing operations at altitudes normally used by arriving and departing aircraft should monitor/communicate on the appropriate frequency while within 10 miles of the airport unless required to do otherwise by the CFR's or local procedures. Such operations include parachute jumping/dropping, en route, practicing maneuvers, etc.

REFERENCE-

AIM, Parachute Jump Aircraft Operations, Paragraph 3-5-4.

d. Airport Advisory/Information Services Provided by a FSS

1. There are three advisory type services provided at selected airports.

(a) Local Airport Advisory (LAA) is provided at airports that have a FSS physically located on the airport, which does not have a control tower or where the tower is operated on a part-time basis. The CTAF for LAA airports is disseminated in the appropriate aeronautical publications.

(b) Remote Airport Advisory (RAA) is provided at selected very busy GA airports, which do not have an operating control tower. The CTAF for RAA airports is disseminated in the appropriate aeronautical publications.

(c) Remote Airport Information Service (RAIS) is provided in support of special events at nontowered airports by request from the airport authority.

2. In communicating with a CTAF FSS, check the airport's automated weather and establish two-way communications before transmitting outbound/inbound intentions or information. An inbound aircraft should initiate contact approximately 10 miles from the airport, reporting aircraft identification and type, altitude, location relative to the airport, intentions (landing or over flight), possession of the automated weather, and request airport advisory or airport information service. A departing aircraft should initiate contact before taxiing, reporting aircraft identification and type,

VFR or IFR, location on the airport, intentions, direction of take-off, possession of the automated weather, and request airport advisory or information service. Also, report intentions before taxiing onto the active runway for departure. If you must change frequencies for other service after initial report to FSS, return to FSS frequency for traffic update.

(a) Inbound

EXAMPLE-
Vero Beach radio, Centurion Six Niner Delta Delta is ten miles south, two thousand, landing Vero Beach. I have the automated weather, request airport advisory.

(b) Outbound

EXAMPLE-
Vero Beach radio, Centurion Six Niner Delta Delta, ready to taxi to runway 22, VFR, departing to the southwest. I have the automated weather, request airport advisory.

3. Airport advisory service includes wind direction and velocity, favored or designated runway, altimeter setting, known airborne and ground traffic, NOTAM's, airport taxi routes, airport traffic pattern information, and instrument approach procedures. These elements are varied so as to best serve the current traffic situation. Some airport managers have specified that under certain wind or other conditions designated runways be used. Pilots should advise the FSS of the runway they intend to use.

CAUTION-
All aircraft in the vicinity of an airport may not be in communication with the FSS.

e. Information Provided by Aeronautical Advisory Stations (UNICOM)

1. UNICOM is a nongovernment air/ground radio communication station which may provide airport information at public use airports where there is no tower or FSS.

2. On pilot request, UNICOM stations may provide pilots with weather information, wind direction, the recommended runway, or other necessary information. If the UNICOM frequency is designated as the CTAF, it will be identified in appropriate aeronautical publications.

f. Unavailability of Information from FSS or UNICOM

Should LAA by an FSS or Aeronautical Advisory Station UNICOM be unavailable, wind and weather information may be obtainable from nearby

controlled airports via Automatic Terminal Information Service (ATIS) or Automated Weather Observing System (AWOS) frequency.

g. Self-Announce Position and/or Intentions

1. General. Self-announce is a procedure whereby pilots broadcast their position or intended flight activity or ground operation on the designated CTAF. This procedure is used primarily at airports which do not have an FSS on the airport. The self-announce procedure should also be used if a pilot is unable to communicate with the FSS on the designated CTAF.

2. If an airport has a tower and it is temporarily closed, or operated on a part-time basis and there is no FSS on the airport or the FSS is closed, use the CTAF to self-announce your position or intentions.

3. Where there is no tower, FSS, or UNICOM station on the airport, use MULTICOM frequency 122.9 for self-announce procedures. Such airports will be identified in appropriate aeronautical information publications.

4. Practice Approaches. Pilots conducting practice instrument approaches should be particularly alert for other aircraft that may be departing in the opposite direction. When conducting any practice approach, regardless of its direction relative to other airport operations, pilots should make announcements on the CTAF as follows:

(a) Departing the final approach fix, inbound (nonprecision approach) or departing the outer marker or fix used in lieu of the outer marker, inbound (precision approach);

(b) Established on the final approach segment or immediately upon being released by ATC;

(c) Upon completion or termination of the approach; and

(d) Upon executing the missed approach procedure.

5. Departing aircraft should always be alert for arrival aircraft coming from the opposite direction.

6. Recommended self-announce phraseologies: It should be noted that aircraft operating to or from another nearby airport may be making self-announce broadcasts on the same UNICOM or MULTICOM frequency. To help identify one airport from another, the airport name should be spoken at the beginning and end of each self-announce transmission.

(a) Inbound

EXAMPLE-
Strawn traffic, Apache Two Two Five Zulu, (position), (altitude), (descending) or entering downwind/base/final (as appropriate) runway one seven full stop, touch-and-go, Strawn.
Strawn traffic Apache Two Two Five Zulu clear of runway one seven Strawn.

(b) Outbound

EXAMPLE-
Strawn traffic, Queen Air Seven One Five Five Bravo (location on airport) taxiing to runway two six Strawn.
Strawn traffic, Queen Air Seven One Five Five Bravo departing runway two six. Departing the pattern to the (direction), climbing to (altitude) Strawn.

(c) Practice Instrument Approach

EXAMPLE-
Strawn traffic, Cessna Two One Four Three Quebec (position from airport) inbound descending through (altitude) practice (name of approach) approach runway three five Strawn.
Strawn traffic, Cessna Two One Four Three Quebec practice (type) approach completed or terminated runway three five Strawn.

h. UNICOM Communications Procedures

1. In communicating with a UNICOM station, the following practices will help reduce frequency congestion, facilitate a better understanding of pilot intentions, help identify the location of aircraft in the traffic pattern, and enhance safety of flight:

(a) Select the correct UNICOM frequency.

(b) State the identification of the UNICOM station you are calling in each transmission.

(c) Speak slowly and distinctly.

(d) Report approximately 10 miles from the airport, reporting altitude, and state your aircraft type, aircraft identification, location relative to the airport, state whether landing or overflight, and request wind information and runway in use.

(e) Report on downwind, base, and final approach.

(f) Report leaving the runway.

2. Recommended UNICOM phraseologies:

(a) Inbound

PHRASEOLOGY-
FREDERICK UNICOM CESSNA EIGHT ZERO ONE TANGO FOXTROT 10 MILES SOUTHEAST DESCENDING THROUGH (altitude) LANDING FREDERICK, REQUEST WIND AND RUNWAY INFORMATION FREDERICK.
FREDERICK TRAFFIC CESSNA EIGHT ZERO ONE TANGO FOXTROT ENTERING DOWNWIND/BASE/ FINAL (as appropriate) FOR RUNWAY ONE NINER (full stop/touch-and-go) FREDERICK.
FREDERICK TRAFFIC CESSNA EIGHT ZERO ONE TANGO FOXTROT CLEAR OF RUNWAY ONE NINER FREDERICK.

(b) Outbound

PHRASEOLOGY-
FREDERICK UNICOM CESSNA EIGHT ZERO ONE TANGO FOXTROT (location on airport) TAXIING TO RUNWAY ONE NINER, REQUEST WIND AND TRAFFIC INFORMATION FREDERICK.
FREDERICK TRAFFIC CESSNA EIGHT ZERO ONE TANGO FOXTROT DEPARTING RUNWAY ONE NINER. "REMAINING IN THE PATTERN" OR "DEPARTING THE PATTERN TO THE (direction) (as appropriate)" FREDERICK.

4-1-10. IFR Approaches/Ground Vehicle Operations

a. IFR Approaches. When operating in accordance with an IFR clearance and ATC approves a change to the advisory frequency, make an expeditious change to the CTAF and employ the recommended traffic advisory procedures.

b. Ground Vehicle Operation. Airport ground vehicles equipped with radios should monitor the CTAF frequency when operating on the airport movement area and remain clear of runways/taxiways being used by aircraft. Radio transmissions from ground vehicles should be confined to safety-related matters.

c. Radio Control of Airport Lighting Systems. Whenever possible, the CTAF will be used to control airport lighting systems at airports without operating control towers. This eliminates the need for pilots to change frequencies to turn the lights on and allows a continuous listening watch on a single frequency. The CTAF is published on the instrument approach chart and in other appropriate aeronautical information publications. For further details concerning radio controlled lights, see AC 150/5340-27, Air-to-Ground Radio Control of Airport

Lighting Systems.

4-1-11. Designated UNICOM/MULTICOM Frequencies

a. Communications between aircraft

CAUTION-
The Federal Communications Commission (FCC) requires an aircraft station license to operate on UNICOM/MULTICOM frequencies and usage must be in accordance with Part 87 of the FCC rules (see Section 87.29 regarding license applications). Misuse of these frequencies may result in either the imposition of fines and/or revocation/suspension of FCC aircraft station license.

b. Frequency use

1. The following listing depicts UNICOM and MULTICOM frequency uses as designated by the Federal Communications Commission (FCC). (See TBL 4-1-2.)

TBL 4-1-2

Unicom/Multicom Frequency Usage

Use	Frequency
Airports without an operating control tower.	122.700 122.725 122.800 122.975 123.000 123.050 123.075
(MULTICOM FREQUENCY) Activities of a temporary, seasonal, emergency nature or search and rescue, as well as, airports with no tower, FSS, or UNICOM.	122.900
(MULTICOM FREQUENCY) Forestry management and fire suppression, fish and game management and protection, and environmental monitoring and protection.	122.925
Airports with a control tower or FSS on airport.	122.950

NOTE-
1. *In some areas of the country, frequency interference may be encountered from nearby airports using the same UNICOM frequency. Where there is a problem, UNICOM operators are encouraged to develop a "least interference" frequency assignment plan for airports concerned using the frequencies designated for airports without operating control towers. UNICOM licensees are encouraged to apply for UNICOM 25 kHz spaced channel frequencies. Due to the extremely limited number of frequencies with 50 kHz channel spacing, 25 kHz channel spacing should be implemented. UNICOM licensees may then request FCC to assign frequencies in accordance with the plan, which FCC will review and consider for approval.*

2. *Wind direction and runway information may not be available on UNICOM frequency 122.950.*

2. The following listing depicts other frequency uses as designated by the Federal Communications Commission (FCC). (See TBL 4-1-3.)

TBL 4-1-3

Other Frequency Usage Designated by FCC

Use	Frequency
Air-to-air communications & private airports (not open to the public).	122.750 122.850
Air-to-air communications (general aviation helicopters).	123.025
Aviation instruction, Glider, Hot Air Balloon **(not to be used for advisory service).**	123.300 123.500

4-1-12. Use of UNICOM for ATC Purposes

UNICOM service may be used for ATC purposes, only under the following circumstances:

1. Revision to proposed departure time.

2. Takeoff, arrival, or flight plan cancellation time.

3. ATC clearance, provided arrangements are made between the ATC facility and the UNICOM licensee to handle such messages.

4-1-13. Automatic Terminal Information Service (ATIS)

a. ATIS is the continuous broadcast of recorded noncontrol information in selected high activity terminal areas. Its purpose is to improve controller effectiveness and to relieve frequency congestion by automating the repetitive transmission of essential but routine information. The information is continuously broadcast over a discrete VHF radio frequency or the voice portion of a local NAVAID. ATIS transmissions on a discrete VHF radio frequency are engineered to be receivable to a maximum of 60 NM from the ATIS site and a maximum altitude of 25,000 feet AGL. At most locations, ATIS signals may be received on the surface of the airport, but local conditions may limit the maximum ATIS reception distance and/or altitude. Pilots are urged to cooperate in the ATIS program as it relieves frequency congestion on approach control, ground control, and local control frequencies. The A/FD indicates airports for which ATIS is provided.

b. ATIS information includes the time of the latest weather sequence, ceiling, visibility, obstructions to visibility, temperature, dew point (if available), wind direction (magnetic), and velocity, altimeter, other pertinent remarks, instrument approach and runway in use. The ceiling/sky condition, visibility,

and obstructions to vision may be omitted from the ATIS broadcast if the ceiling is above 5,000 feet and the visibility is more than 5 miles. The departure runway will only be given if different from the landing runway except at locations having a separate ATIS for departure. The broadcast may include the appropriate frequency and instructions for VFR arrivals to make initial contact with approach control. Pilots of aircraft arriving or departing the terminal area can receive the continuous ATIS broadcast at times when cockpit duties are least pressing and listen to as many repeats as desired. ATIS broadcast shall be updated upon the receipt of any official hourly and special weather. A new recording will also be made when there is a change in other pertinent data such as runway change, instrument approach in use, etc.

EXAMPLE-
Dulles International information Sierra. 1300 zulu weather. Measured ceiling three thousand overcast. Visibility three, smoke. Temperature six eight. Wind three five zero at eight. Altimeter two niner niner two. ILS runway one right approach in use. Landing runway one right and left. Departure runway three zero. Armel VORTAC out of service. Advise you have Sierra.

c. Pilots should listen to ATIS broadcasts whenever ATIS is in operation.

d. Pilots should notify controllers on initial contact that they have received the ATIS broadcast by repeating the alphabetical code word appended to the broadcast.

EXAMPLE-
"Information Sierra received."

e. When a pilot acknowledges receipt of the ATIS broadcast, controllers may omit those items contained in the broadcast if they are current. Rapidly changing conditions will be issued by ATC and the ATIS will contain words as follows:

EXAMPLE-
"Latest ceiling/visibility/altimeter/wind/(other conditions) will be issued by approach control/tower."

NOTE-
The absence of a sky condition or ceiling and/or visibility on ATIS indicates a sky condition or ceiling of 5,000 feet or above and visibility of 5 miles or more. A remark may be made on the broadcast, "the weather is better than 5000 and 5," or the existing weather may be broadcast.

f. Controllers will issue pertinent information to pilots who do not acknowledge receipt of a broadcast or who acknowledge receipt of a broadcast which is not current.

g. To serve frequency limited aircraft, FSS's are equipped to transmit on the omnirange frequency at most en route VOR's used as ATIS voice outlets. Such communication interrupts the ATIS broadcast. Pilots of aircraft equipped to receive on other FSS frequencies are encouraged to do so in order that these

override transmissions may be kept to an absolute minimum.

h. While it is a good operating practice for pilots to make use of the ATIS broadcast where it is available, some pilots use the phrase "have numbers" in communications with the control tower. Use of this phrase means that the pilot has received wind, runway, and altimeter information ONLY and the tower does not have to repeat this information. It does not indicate receipt of the ATIS broadcast and should never be used for this purpose.

4-1-14. Radar Traffic Information Service

This is a service provided by radar ATC facilities. Pilots receiving this service are advised of any radar target observed on the radar display which may be in such proximity to the position of their aircraft or its intended route of flight that it warrants their attention. This service is not intended to relieve the pilot of the responsibility for continual vigilance to see and avoid other aircraft.

a. Purpose of the Service

1. The issuance of traffic information as observed on a radar display is based on the principle of assisting and advising a pilot that a particular radar target's position and track indicates it may intersect or pass in such proximity to that pilot's intended flight path that it warrants attention. This is to alert the pilot to the traffic, to be on the lookout for it, and thereby be in a better position to take appropriate action should the need arise.

2. Pilots are reminded that the surveillance radar used by ATC does not provide altitude information unless the aircraft is equipped with Mode C and the radar facility is capable of displaying altitude information.

b. Provisions of the Service

1. Many factors, such as limitations of the radar, volume of traffic, controller workload and communications frequency congestion, could prevent the controller from providing this service. Controllers possess complete discretion for determining whether they are able to provide or continue to provide this service in a specific case. The controller's reason against providing or continuing to provide the service in a particular case is not subject to question nor need it be communicated to the pilot. In other words, the provision of this service is entirely dependent upon whether controllers believe they are in a position to provide it. Traffic information is routinely provided to all aircraft operating on IFR flight plans except when the pilot declines the service, or the pilot is operating within Class A airspace. Traffic information may be provided to flights not operating on IFR flight plans when requested by pilots of such flights.

NOTE-

Radar ATC facilities normally display and monitor both primary and secondary radar when it is available, except that secondary radar may be used as the sole display source in Class A airspace, and under some circumstances outside of Class A airspace (beyond primary coverage and in en route areas where only secondary is available). Secondary radar may also be used outside Class A airspace as the sole display source when the primary radar is temporarily unusable or out of service. Pilots in contact with the affected ATC facility are normally advised when a temporary outage occurs; i.e., "primary radar out of service; traffic advisories available on transponder aircraft only." This means simply that only the aircraft which have transponders installed and in use will be depicted on ATC radar indicators when the primary radar is temporarily out of service.

2. When receiving VFR radar advisory service, pilots should monitor the assigned frequency at all times. This is to preclude controllers' concern for radio failure or emergency assistance to aircraft under the controller's jurisdiction. VFR radar advisory service does not include vectors away from conflicting traffic unless requested by the pilot. When advisory service is no longer desired, advise the controller before changing frequencies and then change your transponder code to 1200, if applicable. Pilots should also inform the controller when changing VFR cruising altitude. Except in programs where radar service is automatically terminated, the controller will advise the aircraft when radar is terminated.

NOTE-
Participation by VFR pilots in formal programs implemented at certain terminal locations constitutes pilot request. This also applies to participating pilots at those locations where arriving VFR flights are encouraged to make their first contact with the tower on the approach control frequency.

c. Issuance of Traffic Information. Traffic information will include the following concerning a target which may constitute traffic for an aircraft that is:

1. Radar identified

(a) Azimuth from the aircraft in terms of the 12 hour clock, or

(b) When rapidly maneuvering civil test or military aircraft prevent accurate issuance of traffic as in (a) above, specify the direction from an aircraft's position in terms of the eight cardinal compass points (N, NE, E, SE, S, SW, W, NW). This method shall be terminated at the pilot's request.

(c) Distance from the aircraft in nautical miles;

(d) Direction in which the target is proceeding; and

(e) Type of aircraft and altitude if known.

EXAMPLE-
Traffic 10 o'clock, 3 miles, west-bound (type aircraft and altitude, if known, of the observed traffic). The altitude may be known, by means of Mode C, but not verified with the pilot for accuracy. (To be valid for separation purposes by ATC, the accuracy of Mode C readouts must be verified. This is usually accomplished upon initial entry into the radar system by a comparison of the readout to pilot stated altitude, or the field elevation in the case of continuous readout being received from an aircraft on the airport.) When necessary to issue traffic advisories containing unverified altitude information, the controller will issue the advisory in the same manner as if it were verified due to the accuracy of these readouts. The pilot may upon receipt of traffic information, request a vector (heading) to avoid such traffic. The vector will be provided to the extent possible as determined by the controller provided the aircraft to be vectored is within the airspace under the jurisdiction of the controller.

2. Not radar identified

(a) Distance and direction with respect to a fix;

(b) Direction in which the target is proceeding; and

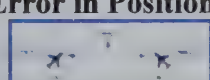
(c) Type of aircraft and altitude if known.

EXAMPLE-
Traffic 8 miles south of the airport northeastbound, (type aircraft and altitude if known).

d. The examples depicted in the following figures point out the possible error in the position of this traffic when it is necessary for a pilot to apply drift correction to maintain this track. This error could also occur in the event a change in course is made at the time radar traffic information is issued.

FIG 4-1-1

Induced Error in Position of Traffic

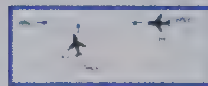


EXAMPLE-
In FIG 4-1-1 traffic information would be issued to the pilot of aircraft "A" as 12 o'clock. The actual position of the traffic as seen by the pilot of aircraft "A"

would be 2 o'clock. Traffic information issued to aircraft "B" would also be given as 12 o'clock, but in this case, the pilot of "B" would see the traffic at 10 o'clock.

FIG 4-1-2

Induced Error in Position of Traffic



EXAMPLE-
In FIG 4-1-2 traffic information would be issued to the pilot of aircraft "C" as 2 o'clock. The actual position of the traffic as seen by the pilot of aircraft "C" would be 3 o'clock. Traffic information issued to aircraft "D" would be at an 11 o'clock position. Since it is not necessary for the pilot of aircraft "D" to apply wind correction (crab) to remain on track, the actual position of the traffic issued would be correct. Since the radar controller can only observe aircraft track (course) on the radar display, traffic advisories are issued accordingly, and pilots should give due consideration to this fact when looking for reported traffic.

4-1-15. Safety Alert

A safety alert will be issued to pilots of aircraft being controlled by ATC if the controller is aware the aircraft is at an altitude which, in the controller's judgment, places the aircraft in unsafe proximity to terrain, obstructions or other aircraft. The provision of this service is contingent upon the capability of the controller to have an awareness of a situation involving unsafe proximity to terrain, obstructions and uncontrolled aircraft. The issuance of a safety alert cannot be mandated, but it can be expected on a reasonable, though intermittent basis. Once the alert is issued, it is solely the pilot's prerogative to determine what course of action, if any, to take. This procedure is intended for use in time critical situations where aircraft safety is in question. Noncritical situations should be handled via the normal traffic alert procedures.

a. Terrain or Obstruction Alert

1. Controllers will immediately issue an alert to the pilot of an aircraft under their control when they recognize that the aircraft is at an altitude which, in their judgment, may be in an unsafe proximity to terrain/obstructions. The primary method of detecting unsafe proximity is through Mode C automatic altitude reports.

EXAMPLE-
Low altitude alert, check your altitude immediately. The, as appropriate, MEA/MVA/MOCA in your area is (altitude) or, if past the final approach fix (nonprecision approach) or the outer marker or fix used in lieu of the outer marker (precision approach), the, as appropriate, MDA/DH (if known) is (altitude).

2. Terminal ARTS IIA, III, AND IIIA facilities have an automated function which, if operating, alerts controllers when a tracked Mode

C equipped aircraft under their control is below or is predicted to be below a predetermined minimum safe altitude. This function, called Minimum Safe Altitude Warning (MSAW), is designed solely as a controller aid in detecting potentially unsafe aircraft proximity to terrain/obstructions. The ARTS IIA, III, and IIIA facility will, when MSAW is operating, provide MSAW monitoring for all aircraft with an operating Mode C altitude encoding transponder that are tracked by the system and are:

(a) Operating on an IFR flight plan; or

(b) Operating VFR and have requested MSAW monitoring.

3. Terminal AN/TPX-42A (number beacon decoder system) facilities have an automated function called Low Altitude Alert System (LAAS). Although not as sophisticated as MSAW, LAAS alerts the controller when a Mode C transponder equipped aircraft operating on an IFR flight plan is below a predetermined minimum safe altitude.

NOTE-
Pilots operating VFR may request MSAW or LAAS monitoring if their aircraft are equipped with Mode C transponders.

EXAMPLE-
Apache Three Three Papa request MSAW/LAAS.

b. Aircraft Conflict Alert.

1. Controllers will immediately issue an alert to the pilot of an aircraft under their control if they are aware of another aircraft which is not under their control, at an altitude which, in the controller's judgment, places both aircraft in unsafe proximity to each other. With the alert, when feasible, the controller will offer the pilot the position of the traffic if time permits and an alternate course(s) of action. Any alternate course(s) of action the controller may recommend to the pilot will be predicated only on other traffic being worked by the controller.

EXAMPLE-
American Three, traffic alert, (position of traffic, if time permits), advise you turn right/left heading (degrees) and/or climb/descend to (altitude) immediately.

4-1-16. Radar Assistance to VFR Aircraft

a. Radar equipped FAA ATC facilities provide radar assistance and navigation service (vectors) to VFR aircraft provided the aircraft can communicate with the facility, are within radar coverage, and can be radar identified.

b. Pilots should clearly understand that authorization to proceed in accordance with such radar navigational assistance does not constitute authorization for the pilot to violate CFR's. In effect, assistance provided is on the basis that navigational guidance information issued is advisory in nature and the job of flying the aircraft safely, remains with the pilot.

c. In many cases, controllers will be unable to determine if flight into instrument conditions will result from their instructions. To avoid possible hazards resulting from being vectored into IFR conditions, pilots should keep controllers advised of the weather conditions in which they are operating and along the course ahead.

d. Radar navigation assistance (vectors) may be initiated by the controller when one of the following conditions exist:

1. The controller suggests the vector and the pilot concurs.

2. A special program has been established and vectoring service has been advertised.

3. In the controller's judgment the vector is necessary for air safety.

e. Radar navigation assistance (vectors) and other radar derived information may be provided in response to pilot requests. Many factors, such as limitations of radar, volume of traffic, communications frequency, congestion, and controller workload could prevent the controller from providing it. Controllers have complete discretion for determining if they are able to provide the service in a particular case. Their decision not to provide the service in a particular case is not subject to question.

4-1-17. Terminal Radar Services for VFR Aircraft

a. Basic Radar Service:

1. In addition to the use of radar for the control of IFR aircraft, all commissioned radar facilities provide the following basic radar services for VFR aircraft:

(a) Safety alerts.

(b) Traffic advisories.

(c) Limited radar vectoring (on a workload permitting basis).

(d) Sequencing at locations where procedures have been established for this purpose and/or when covered by a Letter of Agreement.

NOTE-
When the stage services were developed, two basic

radar services (traffic advisories and limited vectoring) were identified as "Stage I." This definition became unnecessary and the term "Stage I" was eliminated from use. The term "Stage II" has been eliminated in conjunction with the airspace reclassification, and sequencing services to locations with local procedures and/or letters of agreement to provide this service have been included in basic services to VFR aircraft. These basic services will still be provided by all terminal radar facilities whether they include Class B, Class C, Class D or Class E airspace. "Stage III" services have been replaced with "Class B" and "TRSA" service where applicable.

2. Vectoring service may be provided when requested by the pilot or with pilot concurrence when suggested by ATC.

3. Pilots of arriving aircraft should contact approach control on the publicized frequency and give their position, altitude, aircraft call sign, type aircraft, radar beacon code (if transponder equipped), destination, and request traffic information.

4. Approach control will issue wind and runway, except when the pilot states "have numbers" or this information is contained in the ATIS broadcast and the pilot states that the current ATIS information has been received. Traffic information is provided on a workload permitting basis. Approach control will specify the time or place at which the pilot is to contact the tower on local control frequency for further landing information. Radar service is automatically terminated upon being advised to contact the tower.

5. Sequencing for VFR aircraft is available at certain terminal locations (see locations listed in the Airport/Facility Directory). The purpose of the service is to adjust the flow of arriving VFR and IFR aircraft into the traffic pattern in a safe and orderly manner and to provide radar traffic information to departing VFR aircraft. Pilot participation is urged but is not mandatory. Traffic information is provided on a workload permitting basis. Standard radar separation between VFR or between VFR and IFR aircraft is not provided.

(a) Pilots of arriving VFR aircraft should initiate radio contact on the publicized frequency with approach control when approximately 25 miles from the airport at which sequencing services are being provided. On initial contact by VFR aircraft, approach control will assume that sequencing service is requested. After radar contact is established, the pilot may use pilot navigation to enter the traffic pattern or, depending on traffic conditions, approach control may provide the pilot with routings or vectors necessary for proper sequencing with other participating VFR and IFR

traffic en route to the airport. When a flight is positioned behind a preceding aircraft and the pilot reports having that aircraft in sight, the pilot will be instructed to follow the preceding aircraft. THE ATC INSTRUCTION TO FOLLOW THE PRECEDING AIRCRAFT DOES NOT AUTHORIZE THE PILOT TO COMPLY WITH ANY ATC CLEARANCE OR INSTRUCTION ISSUED TO THE PRECEDING AIRCRAFT. If other "nonparticipating" or "local" aircraft are in the traffic pattern, the tower will issue a landing sequence. Radar service will be continued to the runway. If an arriving aircraft does not want the service, the pilot should state "NEGATIVE RADAR SERVICE" or make a similar comment, on initial contact with approach control.

(b) Pilots of departing VFR aircraft are encouraged to request radar traffic information by notifying ground control on initial contact with their request and proposed direction of flight.

EXAMPLE-
Xray ground control, November One Eight Six, Cessna One Seventy Two, ready to taxi, VFR southbound at 2,500, have information bravo and request radar traffic information.

NOTE-
Following takeoff, the tower will advise when to contact departure control.

(c) Pilots of aircraft transiting the area and in radar contact/communication with approach control will receive traffic information on a controller workload permitting basis. Pilots of such aircraft should give their position, altitude, aircraft call sign, aircraft type, radar beacon code (if transponder equipped), destination, and/or route of flight.

b. TRSA Service (Radar Sequencing and Separation Service for VFR Aircraft in a TRSA).

1. This service has been implemented at certain terminal locations. The service is advertised in the Airport/Facility Directory. The purpose of this service is to provide separation between all participating VFR aircraft and all IFR aircraft operating within the airspace defined as the Terminal Radar Service Area (TRSA). Pilot participation is urged but is not mandatory.

2. If any aircraft does not want the service, the pilot should state "NEGATIVE TRSA SERVICE" or make a similar comment, on

initial contact with approach control or ground control, as appropriate.

3. TRSA's are depicted on sectional aeronautical charts and listed in the Airport/Facility Directory.

4. While operating within a TRSA, pilots are provided TRSA service and separation as prescribed in this paragraph. In the event of a radar outage, separation and sequencing of VFR aircraft will be suspended as this service is dependent on radar. The pilot will be advised that the service is not available and issued wind, runway information, and the time or place to contact the tower. Traffic information will be provided on a workload permitting basis.

5. Visual separation is used when prevailing conditions permit and it will be applied as follows:

> **(a)** When a VFR flight is positioned behind a preceding aircraft and the pilot reports having that aircraft in sight, the pilot will be instructed by ATC to follow the preceding aircraft. Radar service will be continued to the runway. THE ATC INSTRUCTION TO FOLLOW THE PRECEDING AIRCRAFT DOES NOT AUTHORIZE THE PILOT TO COMPLY WITH ANY ATC CLEARANCE OR INSTRUCTION ISSUED TO THE PRECEDING AIRCRAFT.
>
> **(b)** If other "nonparticipating" or "local" aircraft are in the traffic pattern, the tower will issue a landing sequence.
>
> **(c)** Departing VFR aircraft may be asked if they can visually follow a preceding departure out of the TRSA. The pilot will be instructed to follow the other aircraft provided that the pilot can maintain visual contact with that aircraft.

6. VFR aircraft will be separated from VFR/IFR aircraft by one of the following:

> **(a)** 500 feet vertical separation.
>
> **(b)** Visual separation.
>
> **(c)** Target resolution (a process to ensure that correlated radar targets do not touch) when using broadband radar systems.

7. Participating pilots operating VFR in a TRSA:

> **(a)** Must maintain an altitude when assigned by ATC

unless the altitude assignment is to maintain at or below a specified altitude. ATC may assign altitudes for separation that do not conform to 14 CFR Section 91.159. When the altitude assignment is no longer needed for separation or when leaving the TRSA, the instruction will be broadcast, "RESUME APPROPRIATE VFR ALTITUDES." Pilots must then return to an altitude that conforms to 14 CFR Section 91.159 as soon as practicable.

(b) When not assigned an altitude, the pilot should coordinate with ATC prior to any altitude change.

8. Within the TRSA, traffic information on observed but unidentified targets will, to the extent possible, be provided to all IFR and participating VFR aircraft. The pilot will be vectored upon request to avoid the observed traffic, provided the aircraft to be vectored is within the airspace under the jurisdiction of the controller.

9. Departing aircraft should inform ATC of their intended destination and/or route of flight and proposed cruising altitude.

10. ATC will normally advise participating VFR aircraft when leaving the geographical limits of the TRSA. Radar service is not automatically terminated with this advisory unless specifically stated by the controller.

c. Class C Service. This service provides, in addition to basic radar service, approved separation between IFR and VFR aircraft, and sequencing of VFR arrivals to the primary airport.

d. Class B Service. This service provides, in addition to basic radar service, approved separation of aircraft based on IFR, VFR, and/or weight, and sequencing of VFR arrivals to the primary airport(s).

e. PILOT RESPONSIBILITY. THESE SERVICES ARE NOT TO BE INTERPRETED AS RELIEVING PILOTS OF THEIR RESPONSIBILITIES TO SEE AND AVOID OTHER TRAFFIC OPERATING IN BASIC VFR WEATHER CONDITIONS, TO ADJUST THEIR OPERATIONS AND FLIGHT PATH AS NECESSARY TO PRECLUDE SERIOUS WAKE ENCOUNTERS, TO MAINTAIN APPROPRIATE TERRAIN AND OBSTRUCTION CLEARANCE, OR TO REMAIN IN WEATHER CONDITIONS EQUAL TO OR BETTER THAN THE MINIMUMS REQUIRED BY 14 CFR SECTION 91.155. WHENEVER COMPLIANCE WITH AN ASSIGNED ROUTE, HEADING AND/OR ALTITUDE IS LIKELY TO COMPROMISE PILOT RESPONSIBILITY RESPECTING TERRAIN AND OBSTRUCTION CLEARANCE, VORTEX EXPOSURE, AND WEATHER MINIMUMS, APPROACH CONTROL SHOULD BE SO ADVISED AND A REVISED CLEARANCE OR INSTRUCTION OBTAINED.

f. ATC services for VFR aircraft participating in terminal radar services are dependent on ATC radar. Services for VFR aircraft are not available during periods of a radar outage and are limited during CENRAP operations. The pilot will be advised when VFR services are limited or not available.

NOTE-
Class B and Class C airspace are areas of regulated airspace. The absence of ATC radar does not negate the requirement of an ATC clearance to enter Class B airspace or two way radio contact with ATC to enter Class C airspace.

4-1-18. Tower En Route Control (TEC)

a. TEC is an ATC program to provide a service to aircraft proceeding to and from metropolitan areas. It links designated Approach Control Areas by a network of identified routes made up of the existing airway structure of the National Airspace System. The FAA initiated an expanded TEC program to include as many facilities as possible. The program's intent is to provide an overflow resource in the low altitude system which would enhance ATC services. A few facilities have historically allowed turbojets to proceed between certain city pairs, such as Milwaukee and Chicago, via tower en route and these locations may continue this service. However, the expanded TEC program will be applied, generally, for nonturbojet aircraft operating at and below 10,000 feet. The program is entirely within the approach control airspace of multiple terminal facilities. Essentially, it is for relatively short flights. Participating pilots are encouraged to use TEC for flights of two hours duration or less. If longer flights are planned, extensive coordination may be required within the multiple complex which could result in unanticipated delays.

b. Pilots requesting TEC are subject to the same delay factor at the destination airport as other aircraft in the ATC system. In addition, departure and en route delays may occur depending upon individual facility workload. When a major metropolitan airport is incurring significant delays, pilots in the TEC program may want to consider an alternative airport experiencing no delay.

c. There are no unique requirements upon pilots to use the TEC program. Normal flight plan filing procedures will ensure proper flight plan processing. Pilots should include the acronym "TEC" in the remarks section of the flight plan when requesting tower en route control.

d. All approach controls in the system may not operate up to the maximum TEC altitude of 10,000 feet. IFR flight may be planned to any satellite airport in proximity to the major primary airport via the same routing.

4-1-19. Transponder Operation

a. General

1. Pilots should be aware that proper application of transponder operating procedures will provide both VFR and IFR aircraft with a higher degree of safety in the environment where high-speed closure rates are possible. Transponders substantially increase the

capability of radar to see an aircraft and the Mode C feature enables the controller to quickly determine where potential traffic conflicts may exist. Even VFR pilots who are not in contact with ATC will be afforded greater protection from IFR aircraft and VFR aircraft which are receiving traffic advisories. Nevertheless, pilots should never relax their visual scanning vigilance for other aircraft.

2. Air Traffic Control Radar Beacon System (ATCRBS) is similar to and compatible with military coded radar beacon equipment. Civil Mode A is identical to military Mode 3.

3. Civil and military transponders should be adjusted to the "on" or normal operating position as late as practicable prior to takeoff and to "off" or "standby" as soon as practicable after completing landing roll, unless the change to "standby" has been accomplished previously at the request of ATC. IN ALL CASES, WHILE IN CONTROLLED AIRSPACE EACH PILOT OPERATING AN AIRCRAFT EQUIPPED WITH AN OPERABLE ATC TRANSPONDER MAINTAINED IN ACCORDANCE WITH 14 CFR SECTION 91.413 SHALL OPERATE THE TRANSPONDER, INCLUDING MODE C IF INSTALLED, ON THE APPROPRIATE CODE OR AS ASSIGNED BY ATC. IN CLASS G AIRSPACE, THE TRANSPONDER SHOULD BE OPERATING WHILE AIRBORNE UNLESS OTHERWISE REQUESTED BY ATC.

4. A pilot on an IFR flight who elects to cancel the IFR flight plan prior to reaching destination, should adjust the transponder according to VFR operations.

5. If entering a U.S. OFFSHORE AIRSPACE AREA from outside the U.S., the pilot should advise on first radio contact with a U.S. radar ATC facility that such equipment is available by adding "transponder" to the aircraft identification.

6. It should be noted by all users of ATC transponders that the coverage they can expect is limited to "line of sight." Low altitude or aircraft antenna shielding by the aircraft itself may result in reduced range. Range can be improved by climbing to a higher altitude. It may be possible to minimize antenna shielding by locating the antenna where dead spots are only noticed during abnormal flight attitudes.

b. Transponder Code Designation

1. For ATC to utilize one or a combination of the 4096 discrete codes FOUR DIGIT CODE DESIGNATION will be used, e.g., code 2100 will be expressed as TWO ONE ZERO ZERO. Due to the operational characteristics of the rapidly expanding automated ATC system, THE LAST TWO DIGITS OF THE SELECTED TRANSPONDER CODE SHOULD ALWAYS READ "00"

UNLESS SPECIFICALLY REQUESTED BY ATC TO BE OTHERWISE.

c. Automatic Altitude Reporting (Mode C)

1. Some transponders are equipped with a Mode C automatic altitude reporting capability. This system converts aircraft altitude in 100 foot increments to coded digital information which is transmitted together with Mode C framing pulses to the interrogating radar facility. The manner in which transponder panels are designed differs, therefore, a pilot should be thoroughly familiar with the operation of the transponder so that ATC may realize its full capabilities.

2. Adjust transponder to reply on the Mode A/3 code specified by ATC and, if equipped, to reply on Mode C with altitude reporting capability activated unless deactivation is directed by ATC or unless the installed aircraft equipment has not been tested and calibrated as required by 14 CFR Section 91.217. If deactivation is required by ATC, turn off the altitude reporting feature of your transponder. An instruction by ATC to "STOP ALTITUDE SQUAWK, ALTITUDE DIFFERS (number of feet) FEET," may be an indication that your transponder is transmitting incorrect altitude information or that you have an incorrect altimeter setting. While an incorrect altimeter setting has no effect on the Mode C altitude information transmitted by your transponder (transponders are preset at 29.92), it would cause you to fly at an actual altitude different from your assigned altitude. When a controller indicates that an altitude readout is invalid, the pilot should initiate a check to verify that the aircraft altimeter is set correctly.

3. Pilots of aircraft with operating Mode C altitude reporting transponders should report exact altitude or flight level to the nearest hundred foot increment when establishing initial contact with an ATC facility. Exact altitude or flight level reports on initial contact provide ATC with information that is required prior to using Mode C altitude information for separation purposes. This will significantly reduce altitude verification requests.

d. Transponder IDENT Feature

1. The transponder shall be operated only as specified by ATC. Activate the "IDENT" feature only upon request of the ATC controller.

e. Code Changes

1. When making routine code changes, pilots should avoid inadvertent selection of Codes 7500, 7600 or 7700 thereby causing momentary false alarms at automated ground facilities. For example, when switching from Code 2700 to Code 7200, switch

first to 2200 then to 7200, NOT to 7700 and then 7200. This procedure applies to nondiscrete Code 7500 and all discrete codes in the 7600 and 7700 series (i.e. 7600-7677, 7700-7777) which will trigger special indicators in automated facilities. Only nondiscrete Code 7500 will be decoded as the hijack code.

2. Under no circumstances should a pilot of a civil aircraft operate the transponder on Code 7777. This code is reserved for military interceptor operations.

3. Military pilots operating VFR or IFR within restricted/warning areas should adjust their transponders to Code 4000 unless another code has been assigned by ATC.

f. Mode C Transponder Requirements

1. Specific details concerning requirements to carry and operate Mode C transponders, as well as exceptions and ATC authorized deviations from the requirements are found in 14 CFR Section 91.215 and 14 CFR Section 99.12.

2. In general, the CFR's require aircraft to be equipped with Mode C transponders when operating:

(a) At or above 10,000 feet MSL over the 48 contiguous states or the District of Columbia, excluding that airspace below 2,500 feet AGL;

(b) Within 30 miles of a Class B airspace primary airport, below 10,000 feet MSL. Balloons, gliders, and aircraft not equipped with an engine driven electrical system are excepted from the above requirements when operating below the floor of Class A airspace and/or; outside of a Class B airspace and below the ceiling of the Class B airspace (or 10,000 feet MSL, whichever is lower);

(c) Within and above all Class C airspace, up to 10,000 feet MSL;

(d) Within 10 miles of certain designated airports, excluding that airspace which is both outside the Class D surface area and below 1,200 feet AGL. Balloons, gliders and aircraft not equipped with an engine driven electrical system are excepted from this requirement.

3. 14 CFR Section 99.12 requires all aircraft flying into, within, or across the contiguous U.S. ADIZ be equipped with a Mode C or Mode S transponder. Balloons, gliders and aircraft not equipped with an engine driven electrical system are excepted from this requirement.

4. Pilots shall ensure that their aircraft transponder is operating on an appropriate ATC assigned VFR/IFR code and Mode C when operating in such airspace. If in doubt about the operational status of either feature of your transponder while airborne, contact the nearest ATC facility or FSS and they will advise you what facility you should contact for determining the status of your equipment.

5. In-flight requests for "immediate" deviation from the transponder requirement may be approved by controllers only when the flight will continue IFR or when weather conditions prevent VFR descent and continued VFR flight in airspace not affected by the CFR's. All other requests for deviation should be made by contacting the nearest Flight Service or Air Traffic facility in person or by telephone. The nearest ARTCC will normally be the controlling agency and is responsible for coordinating requests involving deviations in other ARTCC areas.

g. Transponder Operation Under Visual Flight Rules (VFR)

1. Unless otherwise instructed by an ATC facility, adjust transponder to reply on Mode 3/A Code 1200 regardless of altitude.

2. Adjust transponder to reply on Mode C, with altitude reporting *capability activated* if the aircraft is so equipped, unless deactivation is directed by ATC or unless the installed equipment has not been tested and calibrated as required by 14 CFR Section 91.217. If deactivation is required and your transponder is so designed, turn off the altitude reporting switch and continue to transmit Mode C framing pulses. If this capability does not exist, turn off Mode C.

h. Radar Beacon Phraseology

Air traffic controllers, both civil and military, will use the following phraseology when referring to operation of the Air Traffic Control Radar Beacon System (ATCRBS). Instructions by ATC refer only to Mode A/3 or Mode C operation and do not affect the operation of the transponder on other Mode's.

1. SQUAWK (number). Operate radar beacon transponder on designated code in Mode A/3.

2. IDENT. Engage the "IDENT" feature (military I/P) of the transponder.

3. SQUAWK (number) and IDENT. Operate transponder on specified code in Mode A/3 and engage the "IDENT" (military I/P) feature.

4. SQUAWK STANDBY. Switch transponder to standby position.

5. SQUAWK LOW/NORMAL. Operate transponder on low or normal sensitivity as specified. Transponder is operated in "NORMAL" position unless ATC specifies "LOW" ("ON" is used instead of "NORMAL" as a master control label on some types of transponders.)

6. SQUAWK ALTITUDE. Activate Mode C with automatic altitude reporting.

7. STOP ALTITUDE SQUAWK. Turn off altitude reporting switch and continue transmitting Mode C framing pulses. If your equipment does not have this capability, turn off Mode C.

8. STOP SQUAWK (mode in use). Switch off specified mode. (Used for military aircraft when the controller is unaware of military service requirements for the aircraft to continue operation on another Mode.)

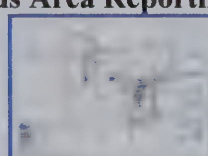
9. STOP SQUAWK. Switch off transponder.

10. SQUAWK MAYDAY. Operate transponder in the emergency position (Mode A Code 7700 for civil transponder. Mode 3 Code 7700 and emergency feature for military transponder.)

11. SQUAWK VFR. Operate radar beacon transponder on Code 1200 in the Mode A/3, or other appropriate VFR code.

FIG 4-1-3

Hazardous Area Reporting Service



4-1-20. Hazardous Area Reporting Service

a. Selected FSS's provide flight monitoring where regularly traveled VFR routes cross large bodies of water, swamps, and mountains. This service is provided for the purpose of expeditiously alerting Search and Rescue facilities when required.
(See FIG 4-1-3.)

1. When requesting the service either in person, by telephone or by radio, pilots should be prepared to give the following information: type of aircraft, altitude, indicated airspeed, present position, route of flight, heading.

2. Radio contacts are desired at least every 10 minutes. If contact is lost for more than 15 minutes, Search and Rescue will be alerted.

Pilots are responsible for canceling their request for service when they are outside the service area boundary. Pilots experiencing two-way radio failure are expected to land as soon as practicable and cancel their request for the service. FIG 4-1-3 depicts the areas and the FSS facilities involved in this program.

b. Long Island Sound Reporting Service.

The New York and Bridgeport AFSS's provide Long Island Sound Reporting service on request for aircraft traversing Long Island Sound.

1. When requesting the service, pilots should ask for SOUND REPORTING SERVICE and should be prepared to provide the following appropriate information:

(a) Type and color of aircraft;

(b) The specific route and altitude across the sound including the shore crossing point;

(c) The overwater crossing time;

(d) Number of persons on board; and

(e) True air speed.

2. Radio contacts are desired at least every 10 minutes; however, for flights of shorter duration a midsound report is requested. If contact is lost for more than 15 minutes Search and Rescue will be alerted. Pilots are responsible for canceling their request for the Long Island Sound Reporting Service when outside the service area boundary. Aircraft experiencing radio failure will be expected to land as soon as practicable and cancel their request for the service.

3. Communications. Primary communications - pilots are to transmit on 122.1 MHz and listen on one of the following VOR frequencies:

(a) New York AFSS Controls:

(1) Hampton RCO (FSS transmits and receives on 122.6 MHz).

(2) Calverton VORTAC (FSS transmits on 117.2 and receives on standard FSS frequencies).

(3) Kennedy VORTAC (FSS transmits on 115.9 and receives on 122.1 MHz).

(b) Bridgeport AFSS Controls:

(1) Madison VORTAC (FSS transmits on 110.4 and receives on 122.15 MHz).

(2) Groton VOR (FSS transmits on 110.85 and receives on 122.15 MHz).

(3) Bridgeport VOR (FSS transmits on 108.8 and receives on 122.1 MHz).

c. Block Island Reporting Service.

Within the Long Island Reporting Service, the New York FSS also provides an additional service for aircraft operating between Montauk Point and Block Island. When requesting this service, pilots should ask for BLOCK ISLAND REPORTING SERVICE and should be prepared to provide the same flight information as required for the Long Island Sound Reporting Service.

1. A minimum of three position reports are mandatory for this service; these are:

(a) Reporting leaving either Montauk Point or Block Island.

(b) Midway report.

(c) Report when over either Montauk Point or Block Island. At this time, the overwater service is canceled.

2. Communications. Pilots are to transmit and receive on 122.6 MHz.

NOTE-
Pilots are advised that 122.6 MHz is a remote receiver located at the Hampton VORTAC site and designed to provide radio coverage between Hampton and Block Island. Flights proceeding beyond Block Island may contact the Bridgeport AFSS by transmitting on 122.1 MHz and listening on Groton VOR (TMU) frequency 111.8 MHz.

d. Cape Cod and Islands Radar Overwater Flight Following.

In addition to normal VFR radar advisory services, traffic permitting, Cape Approach Control provides a radar overwater flight following service for aircraft traversing the Cape Cod and adjacent Island area. Pilots desiring this service may contact Cape RAPCON on 118.2 MHz.

1. Pilots requesting this service should be prepared to give the following information:

(a) Type and color of aircraft;

(b) Altitude;

(c) Position and heading;

(d) Route of flight; and

(e) True airspeed.

2. For best radar coverage, pilots are encouraged to fly at 1,500 feet MSL or above.

3. Pilots are responsible for canceling their request for overwater flight following when they are over the mainland and/or outside the service area boundary.

e. Lake Reporting Service.

Cleveland and Lansing AFSS's provide Lake Reporting Service on request for aircraft traversing the western half of Lake Erie; Green Bay, Kankakee, Lansing, and Terre Haute AFSS's provide Lake Reporting Service on request for aircraft traversing Lake Michigan.

1. When requesting the service, pilots should ask for LAKE REPORTING SERVICE.

2. Pilots not on a VFR flight plan should be prepared to provide all information that is normally provided for a complete VFR flight plan.

3. Pilots already on a VFR flight plan should be prepared to provide the following information:

(a) Aircraft or flight identification.

(b) Type of aircraft.

(c) Near-shore crossing point or last fix before crossing.

(d) Proposed time over near-shore crossing point or last fix before crossing.

(e) Proposed altitude.

(f) Proposed route of flight.

(g) Estimated time over water.

(h) Next landing point.

(i) AFSS/FSS having complete VFR flight plan information.

4. Radio contacts must not exceed 10 minutes when pilots fly at an altitude that affords continuous communications. If radio contact is lost for more than 15 minutes (5 minutes after a scheduled reporting time), Search and Rescue (SAR) will be alerted.

5. The estimated time for crossing the far shore will be the scheduled reporting time for aircraft that fly at an altitude that does not afford continuous communication coverage while crossing the lake. If radio contact is not established within 5 minutes of that time, SAR will be alerted.

6. Pilots are responsible for canceling their request for Lake Reporting Service when outside the service area boundary. Aircraft experiencing radio failure will be expected to land as soon as practicable and cancel their Lake Reporting Service flight plan.

7. Communications. Primary communications - Pilots should communicate with the following facilities on the indicated frequencies:

(a) Cleveland AFSS Controls:

(1) Cleveland RCO (FSS transmits and receives on 122.35 or 122.55 MHz).

(2) Sandusky VOR (FSS transmits on 109.2 and receives on 122.1 MHz).

(b) Green Bay AFSS Controls:

(1) Escanaba VORTAC (FSS transmits on 110.8 and receives on 122.1 MHz).

(2) Green Bay RCO (FSS transmits and receives on 122.55 MHz).

(3) Manistique RCO (FSS transmits and receives on 122.25 MHz).

(4) Manitowoc VOR (FSS transmits on 111.0 and receives on 122.1 MHz).

(5) Menominee VOR (FSS transmits on 109.6 and receives on 122.1 MHz).

(6) Milwaukee RCO (FSS transmits and receives on 122.65 MHz).

(7) Falls VOR (FSS transmits on 110.0 and receives on 122.1 MHz).

(c) Kankakee AFSS Controls:

(1) Northbrook VORTAC (FSS transmits on 113.0 and receives on 122.1 MHz).

(2) Chicago Heights VORTAC (FSS transmits on 114.2 and receives on 122.1 MHz).

(3) Meigs RCO (FSS transmits and receives on 122.15 MHz).

(d) Lansing AFSS Controls:

(1) Lake Erie. Detroit City RCO (FSS transmits and receives on 122.55 MHz).

(2) Lake Michigan:

[a] Keeler VORTAC (FSS transmits on 116.6 and receives on 122.1 MHz).

[b] Ludington RCO (FSS transmits and receives on 122.45 MHz).

[c] Manistee VORTAC (FSS transmits on 111.4 and receives on 122.1 MHz).

[d] Muskegon RCO (FSS transmits and receives on 122.5 MHz).

[e] Pellston RCO (FSS transmits and receives on 122.3 MHz).

[f] Pullman VORTAC (FSS transmits on 112.1 and receives on 122.1 MHz).

[g] Traverse City RCO (FSS transmits and receives on 122.65 MHz).

(e) Terre Haute AFSS Controls. South Bend RCO's

(FSS transmits and receives on 123.65/primary and 122.6/secondary MHz).

f. Everglades Reporting Service.

This service is offered by Miami Automated International Flight Service Station (MIA AIFSS), in extreme southern Florida. The service is provided to aircraft crossing the Florida Everglades, between Lee County (Ft. Myers, FL) VORTAC (RSW) on the northwest side, and Dolphin (Miami, FL) VOR (DHP) on the southeast side.

1. The pilot must request the service from Miami AIFSS.

2. MIA AIFSS frequency information, 122.2, 122.3, and 122.65.

3. The pilot must file a VFR flight plan with the remark: ERS.

4. The pilot must maintain 2000 feet of altitude.

5. The pilot must make position reports every ten (10) minutes. SAR begins fifteen (15) minutes after position report is not made on time.

6. The pilot is expected to land as soon as is practical, in the event of two-way radio failure, and advise MIA AIFSS that the service is terminated.

7. The pilot must notify Miami AIFSS when the flight plan is cancelled or the service is suspended.

4-1-21. Airport Reservations Operations and Procedures

a. FAA operates the Computerized Voice Reservation System (CVRS) which is used to make arrival and/or departure reservations at airports designated by 14 CFR Part 93 Subpart K as High Density Traffic Airports (HDTA). The system may also be used to make arrival and/or departure reservations at airports which are part of a Special Traffic Management Program (STMP). Some STMP's may require users to contact the controlling ARTCC to make reservations, while others will use the CVRS to make reservations. Pilots should check current Notices to Airmen (NOTAM's) to determine airports included in a special traffic management program and reservations procedures.

b. High Density Traffic Airports (HDTA).

1. The FAA, by 14 CFR Part 93, Subpart K, as amended, has designated the John F. Kennedy International Airport (JFK), LaGuardia (LGA), Chicago O'Hare International (ORD), Ronald Reagan Washington National Airport (DCA), and Newark International (EWR) Airports as high density airports and has prescribed air traffic rules and requirements for operating aircraft to and from these airports. (The quota for EWR has been

suspended indefinitely.) Reservations for JFK are required between 3:00 p.m. and 7:59 p.m. local time. Reservations at ORD are required between 6:45 a.m. and 9:15 p.m. local time. Reservations for LGA and DCA are required between 6:00 a.m. and 11:59 p.m. local time. Helicopter operations are excluded from the requirement for a reservation.

NOTE-
Time periods for ORD are in 30-minute increments.

2. The FAA has established an Airport Reservations Office (ARO) to receive and process all Instrument Flight Rules (IFR) requests for operations at the designated HDTA's. This office monitors operation of the high density rule and allots reservations on a "first-come-first-served" basis determined by the time the request is received at the reservation office. Standby lists are not maintained. The ARO utilizes the CVRS to make all reservations. Users may access the computer system using a touch tone telephone, rotary dial telephone, or a personal computer equipped with a modem. Requests for IFR reservations will be accepted starting 48 hours prior to the proposed time of operation at the affected airport. For example, a request for an 11:00 a.m. reservation on a Thursday will be accepted beginning at 11:00 a.m. on the preceding Tuesday. An exception to the 48 hour limitation is made for weekends to recognize normal business hours. Consequently, a reservation request for an IFR operation on Monday would be accepted on the previous Thursday, starting at the proposed hour of operation. Similarly, requests for IFR operations on Tuesday would be accepted on the previous Friday, starting at the proposed hour of operation. For example, a request for an 11:00 a.m. reservation on Tuesday would be accepted beginning at 11:00 a.m. on Friday. Another exception to the 48 hour time limit is made for users who make both an arrival and departure reservation provided they both fall on the same calendar day and they are both made during the same phone call. For example, a reservation request for an 11:00 a.m. arrival on Friday and a 4:00 p.m. departure on Friday may be made beginning at 11:00 a.m. Wednesday.

3. A maximum of two transactions per phone call will be accepted.

4. The ARO will not provide scheduling according to planned departure/arrival time. Assignments will be made on an hourly or 30-minute basis, e.g., an approved reservation for 1300 covers an operation any time between 1300 and 1359 and an approved reservation for 0845 at O'Hare covers an operation between 0845 and 0914.

5. An approved reservation does not constitute a warranty against traffic delays nor does it guarantee arrival and/or departure within such allocated hours. Also, a reservation does not constitute an ATC clearance.

6. The filing of a request for an IFR reservation does not constitute the filing of an IFR flight plan as required by regulation. The IFR flight plan should be filed only after the reservation is obtained and should be filed through normal channels. The ARO is not equipped to accept or process IFR flight plans.

c. IFR Reservations.

1. If operating IFR, an IFR reservation is required prior to takeoff for any operation to or from a high density airport. Users may obtain IFR reservations in either of two ways. They may file their request with the nearest Flight Service Station (FSS) by any available means or call the ARO's interactive computer system via touch-tone telephone, rotary dial telephone, or personal computer modem.

The telephone numbers for the ARO computer are: Using touch-tone or rotary phone: 1-800-875-9694. For Personal Computer and Modem: 1-800-875-9759.

Users may contact the ARO at 703-904-4452 if they have a problem making a reservation or have a question concerning the HDTA regulations. (Being unable to make a reservation due to the fact that all the slots have been allocated is not considered as having a problem making a reservation).

2. When filing a request for an IFR reservation, the pilot should be prepared to provide the following information:

(a) Name(s) of high density traffic airport(s) for which the pilot wishes reservation(s).

(b) Date(s) and hour(s) (UTC) of proposed operation (s).

(c) Aircraft identification/tail number(s).

3. Should the requested time not be available, the user will be offered the closest time before or after the requested time. If an alternate time is accepted, this will be considered as an assigned allocation unless subsequently cancelled by the user.

4. Users are encouraged to advise the ARO whenever they need to change their reservation or to cancel their IFR reservation when it is known that the reservation will not be used. For other than scheduled air carriers/commuters, a cancellation should be made directly to the ARO computer system or an FSS.

5. The following information should be available when cancelling a reservation:

(a) Aircraft identification/tail number.

(b) Airport for which reservation was made.

(c) Date and Time (UTC) of reservation.

(d) Reservation number.

6. To ensure retention of a reservation, a pilot holding an IFR arrival reservation must retain IFR status until in contact with the terminal ATC facility.

7. Reservations are required when filing one of the HDTA's as an alternate airport. Pilots are encouraged to file airports other than the high density as alternate airports.

d. Additional IFR Reservations.

1. If favorable conditions in the system and at the HDTA indicate a significant delay is not likely in the short term, the ARO may coordinate with the HDTA tower to determine that additional IFR reservations may be accommodated for a specific time period. This is an additional IFR reservation as described in 14 CFR Part 93. If additional IFR reservations can be accommodated, they are administered by the ARO under the procedures described above.

2. An operator of an IFR unscheduled operation may take off or land an aircraft without regard to the maximum allocation if a reservation is obtained from ATC in accordance with the procedures above. A reservation is granted for an additional IFR operation only if it can be accommodated by ATC without significant additional delay to operations already allocated. The granting of an additional IFR reservation is contingent upon dynamic, short-term traffic and weather conditions. Generally, availability of additionals will not be known more than 8 hours in advance of the current time. If available, IFR additionals will be granted on a first-come-first- served basis.

3. An operator who has been unable to obtain a reservation under the normal 48 hour in advance procedure may find they are able to obtain a reservation on the scheduled day of operation when additionals can be authorized.

e. Visual Flight Rules (VFR) Reservations.

1. The operator of a VFR unscheduled operation may take off or land an aircraft under VFR at an HDTA if a departure or arrival reservation is obtained from the FAA ATC facility serving the HDTA.

2. Under 14 CFR Part 93, a VFR operation is considered to be an

additional operation. VFR additional operations may be granted by ATC if they can be accommodated without significant delay to operations already allocated. In addition, the reported ceiling at the HDTA must be at least 1,000 feet and the reported ground visibility at least 3 miles.

3. Each HDTA lies within Class B airspace. A clearance from ATC to enter the airspace or depart the airport under VFR constitutes an approval for a VFR additional reservation.

4. Any time an HDTA is not authorizing VFR operations, a NOTAM to that effect will be issued by the controlling ATC facility and a recording placed on the Automated Terminal Information Service. This information can be obtained from any FSS or by referring to the HDTA teletype weather report. The code "VNA" at the end of the weather report indicates VFR arrival reservations are not authorized. The indication will not be made when IFR weather conditions exist.

5. The requirements for obtaining reservations pursuant to 14 CFR Part 93, Subpart K, are mandatory. Failure to operate in accordance with the CFR's may be grounds for enforcement action.

f. Special Traffic Management Programs (STMP).

1. Special procedures may be established when a location requires special traffic handling to accommodate above normal traffic demand (e.g., the Indianapolis 500, Super Bowl, etc.) or reduced airport capacity (e.g., airport runway/taxiway closures for airport construction). The special procedures may remain in effect until the problem has been resolved or until local traffic management procedures can handle the situation and a need for special handling no longer exists.

2. There will be two methods available for obtaining slot reservations at the ATCSCC: the web interface and the touch-tone interface. If these methods are used, a NOTAM will be issued relaying the web site address and toll-free telephone number. Be sure to check current NOTAM's to determine: what airports are included in the STMP; the dates and times reservations are required; the time limits for reservation requests; the point of contact for reservations; and any other instructions.

g. Making HDTA Reservations using the CVRS.

1. Computer Modem Users. A Personal Computer (PC) may be used to make reservations on the CVRS. Equipment required is a computer with a modem capable of a 300 to 9600 baud rate and a communications software program. There are several communications software programs available from many computer stores. The type program required is one which is used to connect

with a Bulletin Board System (BBS). The CVRS modem data is transmitted using No Parity, 8 data bits, and 1 stop bit (N,8,1). Be sure your computer software is set to these parameters.

2. When your computer connects with CVRS, you will be presented with a screen that will ask you to log on. If this is the first time you have logged onto the CVRS, you will be asked for your name, the city you are calling from, and a password. (Be sure to record your password for future use). CVRS uses your name and password to save your computer "set-up" so that the next time you call you will have the same display. After you have logged on, every thing you need to do involving a reservation is menu driven. There are also several files you can download which explain CVRS operations in greater detail.

3. Telephone users. When using the telephone to make a reservation, you are prompted for input of information about what you wish to do. All input is accomplished using the keypad or rotary dial on the telephone. The only problem with a telephone is that most keys have a letter and number associated with them. When the system asks for a date or time, it is expecting an input of numbers. A problem arises when entering a tail number. The system does not detect if you are entering a letter (alpha character) or a number. Therefore, when entering a tail number two keys are used to represent each letter or number. When entering a number, precede the number you wish by the number 0 (zero) i.e. 01, 02, 03, 04, ... If you wish to enter a letter, first press the key on which the letter appears and then press 1, 2, or 3, depending upon whether the letter you desire is the first, second, or third letter on that key. For example to enter the letter "N" first press the "6" key because "N" is on that key, then press the "2" key because the letter "N" is the second letter on the "6" key. Since there are no keys for the letters "Q" and "Z" CVRS pretends they are on the number "1" key. Therefore, to enter the letter "Q", press 11, and to enter the letter "Z" press 12.

NOTE-
Users are reminded to enter the "N" character with their tail numbers. (See TBL 4-1-4.)

TBL 4-1-4

Codes for Tail Number Input

Codes for Tail Number Input Only			
A-21	J-51	S-73	1-01
B-22	K-52	T-81	2-02
C-23	L-53	U-82	3-03
D-31	M-61	V-83	4-04
E-32	N-62	W-91	5-05
F-33	O-63	X-92	6-06

G-41	P-71	Y-93	7-07
H-42	Q-11	Z-12	8-08
I-43	R-72	0-00	9-09

4. Additional helpful key entries: (See TBL 4-1-5.)

TBL 4-1-5

Helpful Key Entries

#	After entering a tail number, depressing the "pound key" (#) twice will indicate the end of the tail number.
*2	Will take the user back to the start of the process.
*3	Will repeat the tail number used in a previous reservation.
*5	Will repeat the previous question.
*8	Tutorial Mode: In the tutorial mode each prompt for input includes a more detailed description of what is expected as input. *8 is a toggle on/off switch. If you are in tutorial mode and enter *8, you will return to the normal mode.
*0	Expert Mode: In the expert mode each prompt for input is brief with little or no explanation. Expert mode is also on/off toggle.

4-1-22. Requests for Waivers and Authorizations from Title 14, Code of Federal Regulations (14 CFR)

a. Requests for a Certificate of Waiver or Authorization (FAA Form 7711-2), or requests for renewal of a waiver or authorization, may be accepted by any FAA facility and will be forwarded, if necessary, to the appropriate office having waiver authority.

b. The grant of a Certificate of Waiver or Authorization from 14 CFR constitutes relief from specific regulations, to the degree and for the period of time specified in the certificate, and does not waive any state law or local ordinance. Should the proposed operations conflict with any state law or local ordinance, or require permission of local authorities or property owners, it is the applicant's responsibility to resolve the matter. The holder of a waiver is responsible for compliance with the terms of the waiver and its provisions.

c. A waiver may be canceled at any time by the Administrator, the person authorized to grant the waiver, or the representative designated to monitor a specific operation. In such case either written notice of cancellation, or written confirmation of a verbal cancellation will be provided to the holder.

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Federal Communications Commission

International Civil Aviation Organization

International Telecommunications Union

National Telecommunications and Information Administration

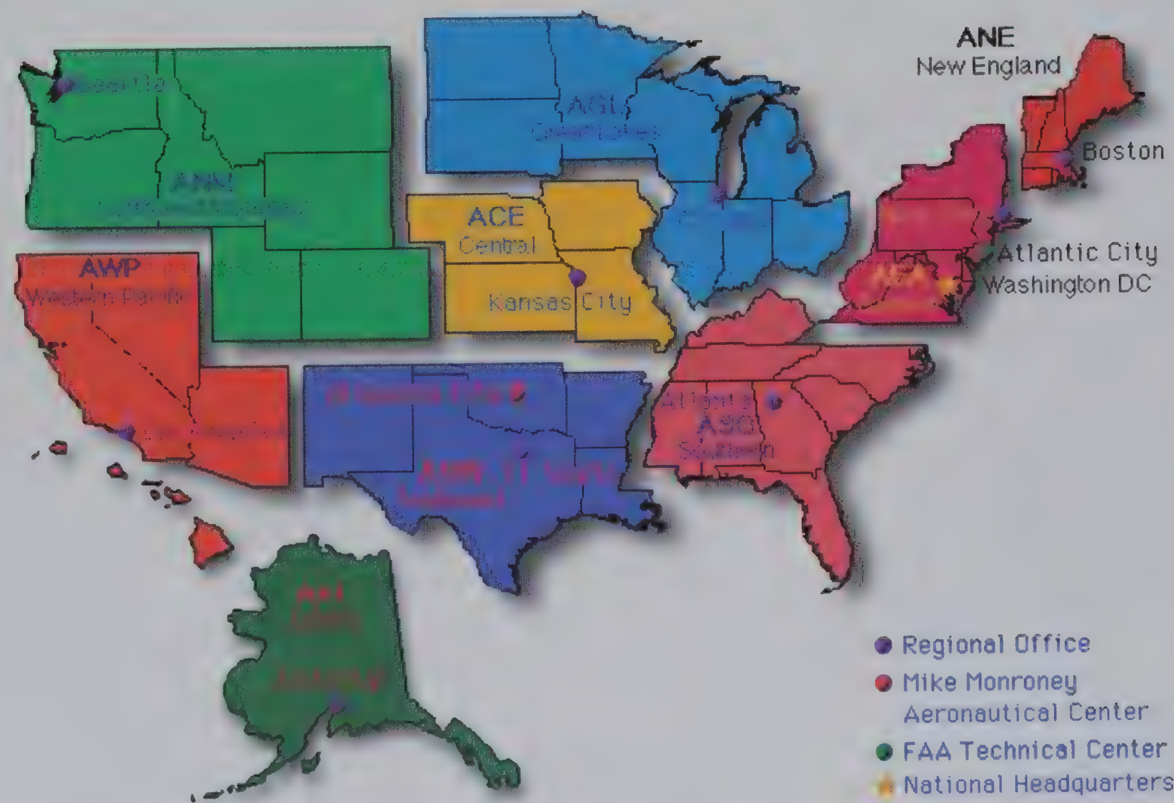
United Nations

Office of Spectrum Policy and Management

Centers And Regions Map

Centers & Regions Map | Frequency Management Offices

To view site of the centers, please click on the appropriate region or center name.

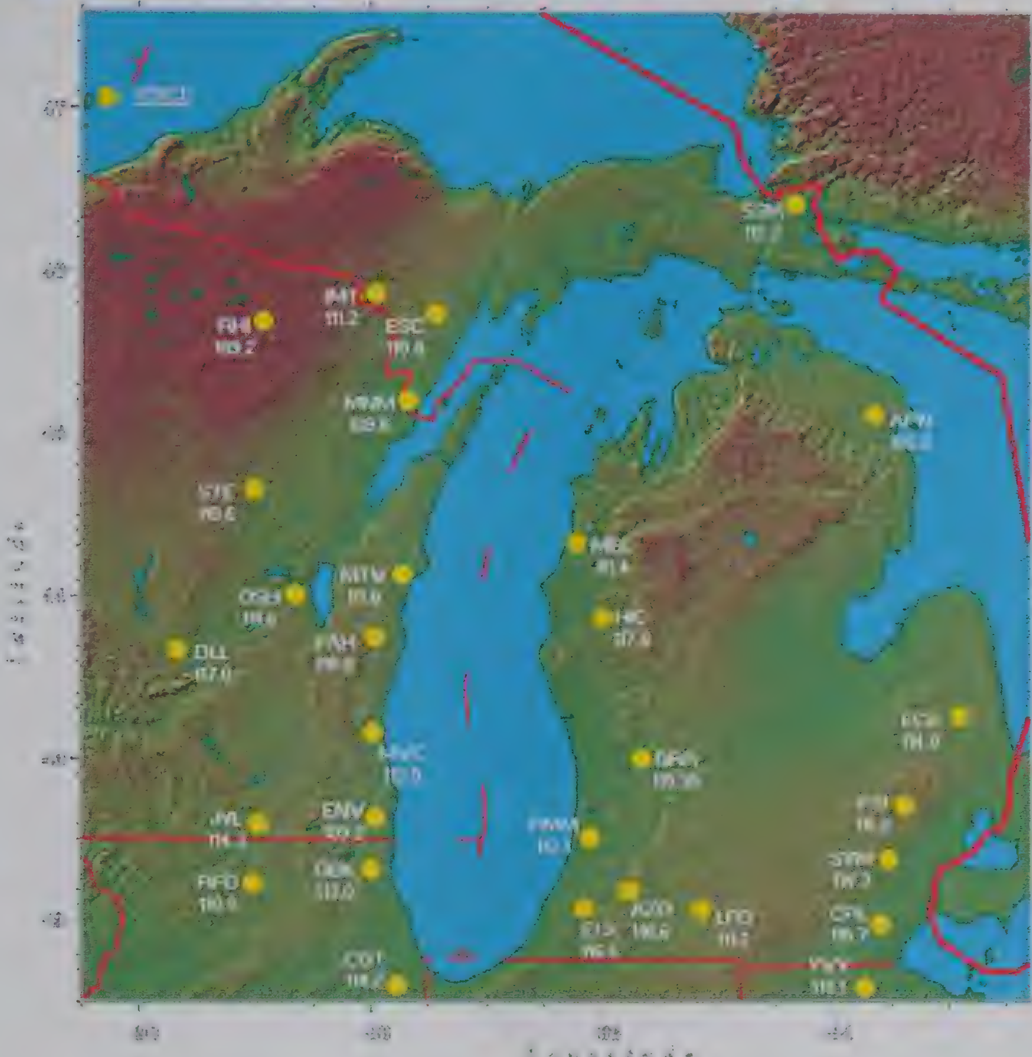


Office of Spectrum Policy and Management

Radio Frequency Bands Supporting Aviation

Frequency	Band Name	Person
190 - 435 & 510 - 535 kHz	Non-directional Beacons	Christein
2100 - 28,000 kHz	HF Communications	Pawlowitz
75 MHz	NAVAID (Marker Beacons)	Christein
108 - 112 MHz	VOR; ILS Localizer	Christein
112 - 118 MHz	VOR; SCAT-I Radionavigation data link	Christein
118 - 137 MHz	VHF Air / Ground Communications	Nellis
138 - 150.8 & 162 - 174 MHz	Fixed, Mobil	Sandors Murphy
225 - 328.6 & 335.4 - 400 MHz	UHF Air / Ground Communications (U.S. Military)	O'Rear
328.6 - 335.4 MHz	ILS Glide Slope	Christein
406.1 - 420 MHz	Fixed, Mobil	Sandors
932 - 935 & 941 - 944 MHz	RMM, LLWAS, LDRCL, etc.	Murphy
960 - 1215 MHz	NAVAID (TACAN / DME, etc.)	Christein
1030 & 1090 MHz	Air Traffic Control Radar Beacon; Mode S; TCAS	Nellis Pawlowitz
1215 - 1400 MHz	Air Route Surveillance Radar; GPS and GLONASS L1	Nellis Pawlowitz
1545 - 1559 MHz	Satellite-Based Comm (To Aircraft)	Murphy
1559 - 1610 MHz	Satellite Navigation; GPS and GLONASS L1	Murphy
1646.5 - 1660.5 MHz	Satellite-Based Comm (From Aircraft)	Murphy
1710 - 1850 MHz	LDRCL; fixed links	Murphy
2700 - 3000 MHz	Airport Surveillance and Weather Radar	Nellis Pawlowitz
5000 - 5250 MHz	Microwave Landing System	Christein
5600 - 5650 MHz	TDWR	Nellis Pawlowitz
7125 - 8500 MHz	RCL	Murphy
9000 - 9200 MHz	Military Precision Approach Radar	Nellis Pawlowitz
14.4 - 15.35 GHz	Microwave Link	Murphy
15.7 - 16.2 GHz	Radar (ASDE-3)	Nellis Pawlowitz
21.2 - 23.6 GHz	Microwave Link	Murphy
All other microwave		Murphy
All other radar		Nellis Pawlowitz
All remaining frequencies		Sandors

Lansing AFSS Overlay Map



OFF
ON
DISCRETE FREQS

OFF
ON
VOR VOICE

OFF
ON
NAVAIDS

OFF
ON
LAKE REPORTING

Click the On/Off buttons above to toggle the overlay maps.

home

Lansing AFSS Overlay Map

OFF | DISCRETE FREQS

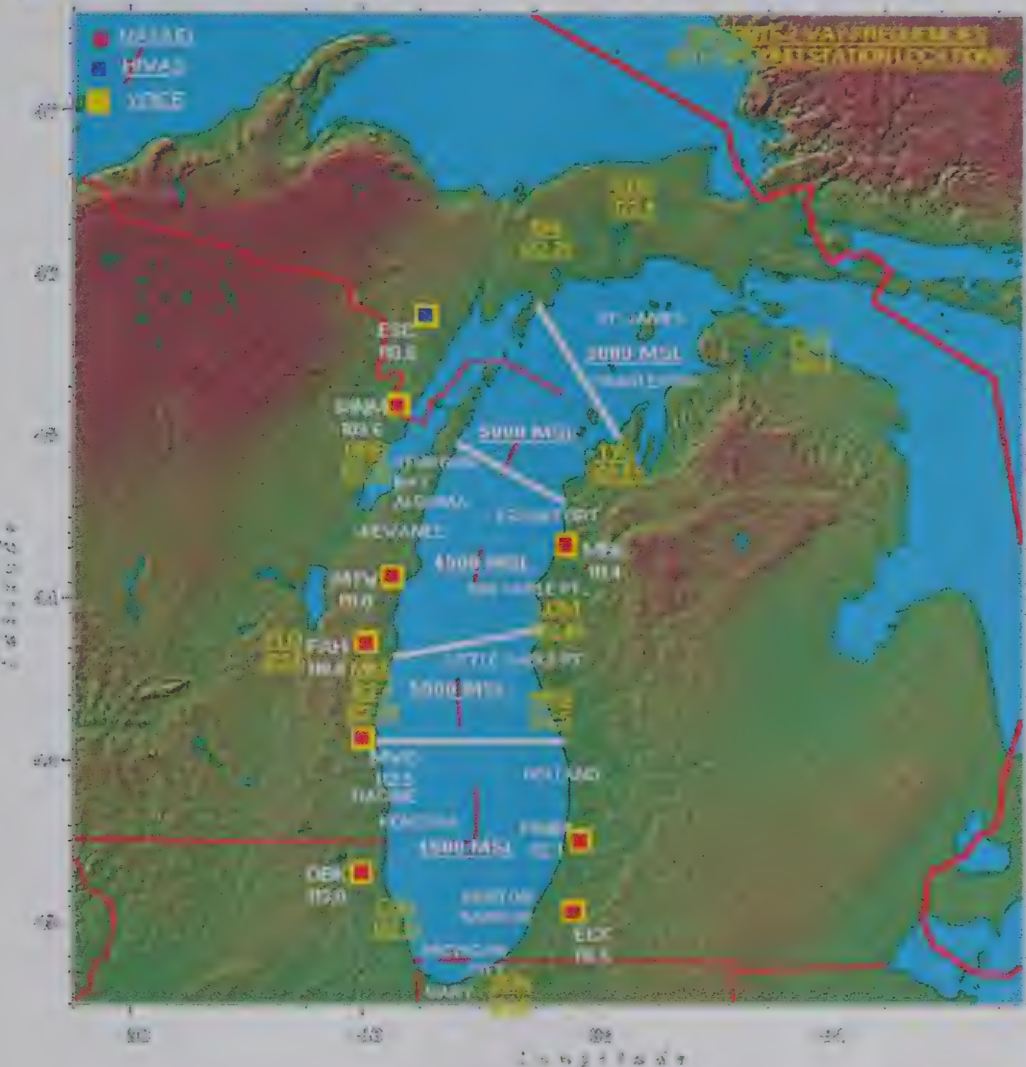
OFF | VOR VOICE

ON | NAVAIDS

OFF | LAKE REPORTING

Click the On/Off buttons shown to toggle the overlay maps.

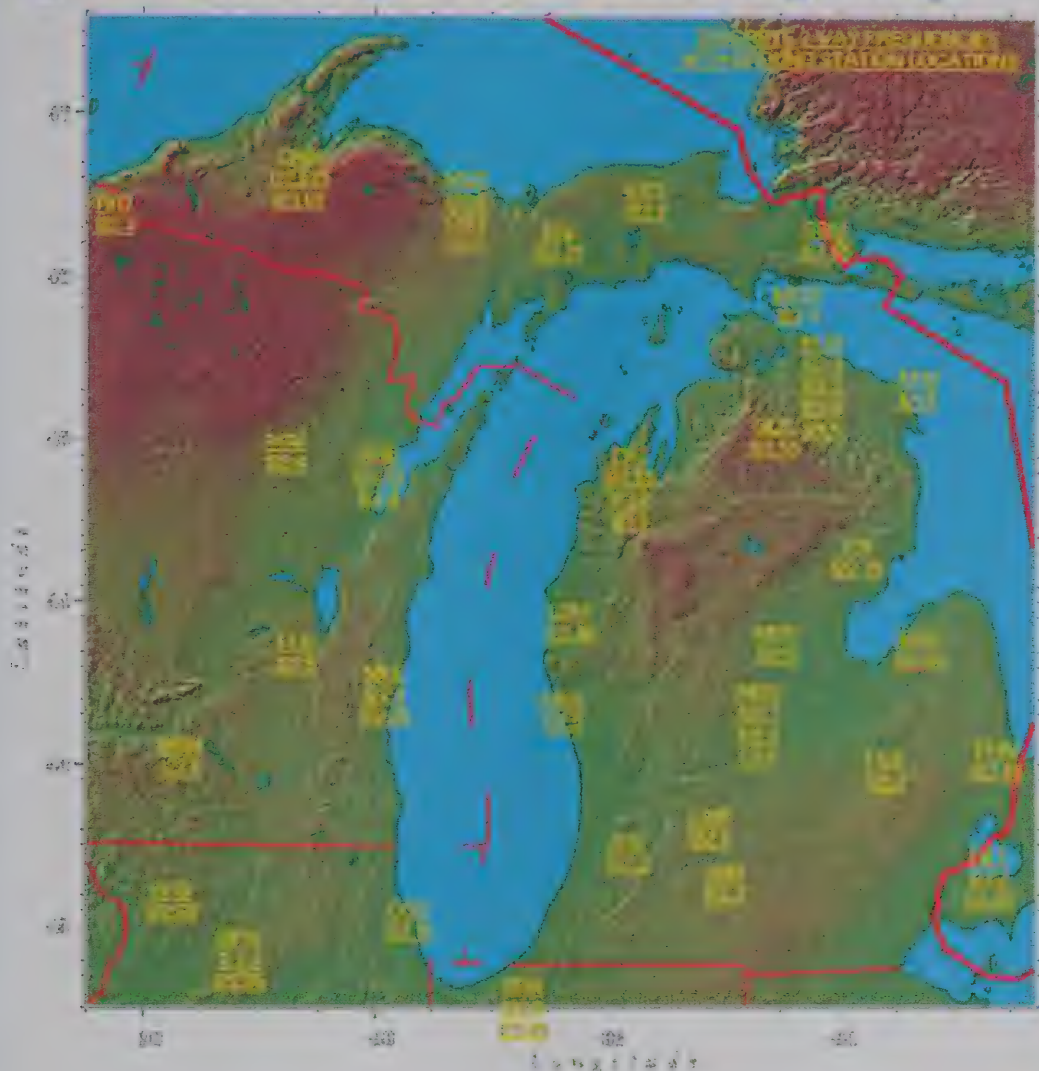
Lansing AFSS Overlay Map



OFF / ON	DISCRETE FREQS
OFF / ON	VOR VOICE
OFF / ON	NAVAIDS
OFF / ON	LAKE REPORTING

Click the On/Off buttons above to toggle the overlay maps.

Lansing AFSS Overlay Map



OFF / ON	DISCRETE FREQS
OFF / ON	VOR VOICE
OFF / ON	NAVAIDS
OFF / ON	LAKE REPORTING

Click the ON/OFF buttons above to toggle the overlay maps.

Accident Prevention Program

Using The System

TCA--TRSA

The Transponder --The forerunner to today's Air Traffic Control (ATC) Radar Beacon System was developed during Would War II to enable military radar operators to Identify aircraft as friend or enemy. That system was known as IFF (identification friend or foe). Utilizing both ground and airborne equipment the system's ground transmitter sent a Signal to the aircraft transceiver which in turn replied in a set code depending upon how the pilot had tuned his selector. Only a few codes were used at that time and these were Changed daily or more often.

When radar was first implemented in the Air Traffic Control System the normal radar echo return from the metal surfaces of aircraft seemed to be sufficient to Identify an aircraft on the radar scope. But as traffic Increased particularly in the high density terminal areas the need for positive means of identification was soon recognized. The old World War II IFF 10 code system seemed to be the answer or at least a beginning for the Air Traffic Control Radar Beacon System The first ATC transponders developed for the system had a Capability of 64 different codes There are now 4,096 individual codes and in addition by using a transponder with mode IC attachment the system is capable of reporting the aircraft's altitude.

Who Needs a Transpondor? Pilots normally prefer to fly VFR and will continue to do so in most of the U.S. airspace in the foreseeable future. They may continue to fly VFR and still enjoy the advantages of the FAA radar service network without being under the control of ATC.

When flying within an area of radar coverage and the aircraft can be indentified pilots may request radar assistance or service providing they have a two-way radio for communicating with the radar facility. This does not place them under positive control but they can receive radar assistance and surveillance especially when their aircraft is transponder equipped. The transponder is simply an electronic device that aids the controller in making faster and more positive identification of aircraft. Aircraft without a transponder can normally be detected by radar but not as distinctively and may require the pilot to alter course so the radar operator can establish positive identification. With radio communications and a transponder, a pilot knows that the controller at the radar facility has an immediate, electronic picture of the aircraft's identity, speed, and direction of flight. And with the mode C attachment the controller also knows the altitude of the aircraft which greatly reduces the need for communication between pilot and controller. The transponder is your best ticket for sharing the advantages of the FAA's Air Traffic Control network especially in busy terminal control areas.

TRSA, Terminal Radar service Area. More than 100 moderately busy airports in the United States have been designated as Terminal Radar Service Areas (TRSA) The size and shape of a terminal radar service area varies from airport to airport but generally speaking it resembles a circular chunk of airspace extending outward and upward from the airport. Radar service within TRSA airspace is automatically provided and although not mandatory, all pilots operating within the TRSA should for their safety and the safety of others notify air traffic control.

There are currently three stages of terminal radar service:

Stage I provides traffic information and limited vectoring to VFR pilots when the controller's workload permits. Stage II offers traffic information and vectoring, plus sequencing of arriving VFR aircraft into the traffic pattern and traffic advisories for departing aircraft Stage III provides all of stage I and II plus separation service for VFR pilots from IFR and other participating VFR traffic within the TRSA.

In conjunction with ongoing efforts to simplify the National Terminal Radar Program the term Stage I will be deleted early in 1981. The service (traffic information and limited vectoring) will continue to be provided to VFR aircraft, by all commissioned ATC terminal radar facilities VFR pilots should keep in mind that participating in the terminal radar service area program does not relieve them of the responsibility of maintaining a continuous scan for other traffic. Remember, other pilots may not be participating or in contact with air traffic control, so it is still the pilot's responsibility to avoid other aircraft, clouds, terrain, and obstacles.

TCA, Terminal Control Area. Unlike the TRSA, where pilots may or may not choose to participate, it is mandatory that pilots obtain clearance from Air Traffic Control before entering a TCA. TCA's are blocks of airspace surrounding the busiest airports throughout the United States; e.g. Atlanta, Chicago, New York, Los Angeles, and San Francisco; and are divided into two groups. Aircraft equipment requirements to operate into a Group II TCA are a two-way radio, VOR or TACAN receiver and a 4096 code transponder. In addition to the Group II requirements, Group I TCAs require transponders to have Mode "C" automatic altitude reporting capability and pilots to hold at least a private pilot certificate to land or take off at the primary airport within the TCA.

Procedures for operation within or through a TCA are:

1. Plan during pre-flight preparation for alternative routes and altitudes in the event that you are unable to obtain your desired clearance. Refer to your Sectional Aeronautical Chart or VFR Terminal Area Chart for TCA boundaries.

2. Do not enter a TCA without specific clearance.

3. Contact the controller far enough from the TCA boundaries to permit altering your course if traffic conditions do not permit your immediate clearance into the TCA.

4. When you contact the controller state the following:

    a. Your full call sign
    b. Make/model of your aircraft
    c. Whether or not your transponder has Mode C capability
    d. Your position
    e. Your destination
    f. Your route
    g. The altitude you are requesting
    h. Whether or not you are familiar with the particular TCA

You are still responsible for avoiding other aircraft, clouds, and obstacles--so keep scanning.

TCA's and TRSA's are depicted on Sectional, World Aeronautical, and En-Route Low Altitude Charts, as well as on DOD Flight Information Publications, and special TCA maps. Air Traffic Services are clearly explained in the Airman's Information Manual. Further information may be obtained at FAA Air Traffic or Flight Standards offices.

(END OF DOCUMENT FAA-P-8740-32 AFO-800-11-80)

Accident Prevention Program

RADIO COMMUNICATIONS PHRASEOLOGY AND TECHNIQUES

GENERAL

a. Radio communications are a critical link in the ATC system. The link can be a strong bond between pilot and controller or it can be broken with surprising speed and disastrous results. Discussion herein provides basic procedures for new pilots and also highlights safe operating concepts for all pilots.
b. The single, most important thought in pilot-controller communications is understanding. It is essential, therefore, that pilots acknowledge each radio communication with ATC by using the appropriate aircraft call sign. Brevity is important, and contacts should be kept as brief as possible, but the controller must know what you want to do before he can properly carry out his control duties. And you, the pilot, must know exactly what he wants you to do. Since concise phraseology may not always be adequate, use whatever words are necessary to get your message across.
c. All pilots will find the Pilot/Controller Glossary very helpful in learning what certain words or phrases mean. Good phraseology enhances safety and is the mark. of a professional pilot. Jargon, chatter and "CB" slang have no place in ATC communications. The Pilot/Controller Glossary is the same glossary used in the ATC controller's handbook. We recommend that it be studied and reviewed from time to time to sharpen your communication skills.
d. Calls to air traffic control (ATC) facilities (ARTCCs, Towers, FSSs, Central Flow, and Communications Control Centers) over radio and ATC operational telephone lines (lines used for operational purposes such as controller instructions, briefings, opening and closing flight plans, issuance of IFR clearances and amendments, counter hijacking activities, etc.) may be monitored and recorded for operational uses such accident investigations, accident prevention, search and rescue purposes, specialist training and evaluation, and technical evaluation and repair of control and communications systems.

RADIO TECHNIQUE

a. *Listen* before you transmit. Many times can get the information you want through ATIS or by monitoring the frequency. Except for a few situations where some frequency overlap occurs, if you hear someone else talking, the keying of your transmitter will be futile and you will probably jam their receiver causing them to repeat their call. If you have just changed frequencies, pause, listen and make sure the frequency is clear.
b. *Think* before keying your transmitter. Know what you want to say and if it lengthy. e.g., a flight plan or IFR position report, jot it down.
c. The microphone should very close to your lips and after pressing the mike button, a slight pause may be necessary to be sure the first word is transmitted. Speak in a normal conversational tone.
d. When you release the button, wait a few seconds before calling again. The controller or FSS specialist may be jotting down your number, or looking for your flight plan, transmitting on a different frequency, or selecting his transmitter to your frequency.
e. Be alert to the sounds *or lack of sounds* in your receiver. Check your volume, recheck your frequency and *make sure your microphone is not stuck* in the transmit position. Frequency blockage can, and has, occurred for extended periods of time due to unintentional transmitter operation. This type of interference is commonly referred to as "stuck mike," and controllers may refer it in this manner when attempting to assign an alternate frequency. If the assigned frequency is completely blocked by this type of interference, use the procedures described for en route IFR radio frequency outage, to establish or reestablish communications with ATC.
f. Be sure that you are within the performance range of your radio equipment and the ground station

equipment. Remote radio sites do not always transmit and receive on all of a facilities available frequencies, particularly with regard to VOR sites where you can hear but not reach a ground station's receiver. Remember that higher altitude increases the range of VHF "line of sight" communications.

CONTACT PROCEDURES

a. **Initial Contact.**
  1. The term initial contact or initial callup means the first radio call you make to a given facility, or the first call to a different controller or FSS specialist within a facility. *Use the following format:*
     a. name of facility being called,
     b. your *full* aircraft identification as filed in the flight plan or as discussed under Aircraft Call Signs below,
     c. type of message to follow or your request if it is short, and
     d. the word "Over"

     EXAMPLE
     "NEW YORK RADIO, MOONEY THREE ONE ONE ECHO, OVER"
     EXAMPLE:
     "COLUMBIA GROUND, CESSNA THREE ONE SIX ZERO FOXTROT, IFR MEMPHIS OVER."
     EXAMPLE:
     "MIAMI CENTER BARON FIVE SIX THREE HOTEL, REQUEST VFR TRAFFIC ADVISORIES, OVER"
  2. If radio reception is reasonably assured, inclusion of your request, your position or altitude, the phrase "Have numbers" or "'Information Charlie received" (for ATIS) in the initial contact helps decrease radio frequency congestion. Use discretion and do not overload the controller with information he does not need. If you do not get a response from the ground station, recheck your radios or use another transmitter but keep the next contact short.
     EXAMPLE:
     "ATLANTA CENTER, DUKE FOUR ONE ROMEO, REQUEST VFR TRAFFIC ADVISORIES, TWENTY NORTHWEST ROME, SEVEN THOUSAND FIVE HUNDRED, OVER"

b. **Initial Contact When your Transmitting and Receiving Frequencies are Different**
  1. If you are attempting to establish contact with a ground station and you are receiving on a different frequency than that transmitted, indicate the VOR name or the frequency on which you expect a reply. Most FSSs and control facilities can transmit on several VOR stations in the area. Use the appropriate FSS call sign as indicated on charts.
     EXAMPLE:
     New York FSS transmits on the Kennedy, Hampton and Calverton VORTACs. If you are in the Calverton area, your callup should be "NEW YORK RADIO, CESSNA THREE ONE SIX ZERO FOXTROT, RECEIVING CALVERTON VOR, OVER."
  2. If the chart indicates FSS frequencies above the VORTAC or in FSS communications boxes transmit or receive on those frequencies nearest your location.
  3. When unable to establish contact and you wish to call *any* ground station, use the phrase "ANY RADIO (tower) (station), GIVE CESSNA THREE ONE SIX ZERO FOXTROT A CALL ON (frequency) OR (VOR)." If an emergency exists or you need assistance, so state.

c. **Subsequent Contacts and Responses to Callup from a Ground Facility.**
  Use the same format as used for initial contact except you should state your message or request with the callup in one transmission. The ground station name and the word "Over" may be omitted if the message require an obvious reply and there is no possibility for misunderstanding. *You should acknowledge all callups or clearances* unless the controller or FSS specialist advises otherwise. There arc some occasions when the controller must issue time-critical instructions to other aircraft and he may be in a position to observe your response, either visually or on radar. If the situation demands your response, take appropriate action or immediately advise the facility of any problem. Acknowledgment is made with one

of the words "Wilco, Roger, Affirmative, Negative" or other appropriate remark (e.g., "PIPER TWO ONE FOUR LIMA, ROGER"). If you have been receiving services (e.g., VFR traffic advisories and you are leaving the area or changing frequencies), advise the ATC facility and terminate contact.

d. **Acknowledgment of Frequency Changes.**
When advised by ATC to change frequencies, acknowledge the instruction. If you select the new frequency without an acknowledgment, the controller's work load is increased because he has no way of knowing whether you received the instruction or have had radio communications failure.

e. **Compliance with Frequency Changes.**
When instructed by ATC to change frequencies, select the new frequency as soon as possible unless instructed to make the change at a specific time, fix, or altitude. A delay in making the change could result in an untimely receipt of important information. It you are instructed to make the frequency change at a specific time, fix, or altitude, monitor the frequency you are on until reaching the specified time, fix, or altitude unless instructed otherwise by ATC.

DIRECT COMMUNICATIONS - CONTROLLERS AND PILOTS

1. ARTCCs are capable of direct communications with IFR air traffic on certain frequencies. Maximum communications coverage is possible through the use of Remote Center Air/Ground (RCAG) sites comprised of both VHF and UHF transmitters and receivers. These sites are located throughout the U.S.. Although they may be several hundred miles away from the ARTCC, they are remoted to the various ARTCCs by land lines or microwave links. Since IFR operations are expedited through the use of direct communications, pilots are requested to use these frequencies strictly for communications pertinent to the control of IFR aircraft. Flight plan filing, en route weather, weather forecasts and similar data should be requested through FSSs, company radio, or appropriate military facilities capable of performing these services.
2. An ARTCC is divided into sectors. Each sector is handled by one or a team of controllers and has its own sector discrete frequency. As a flight progresses from one sector to another, the pilot is requested to change to the appropriate sector discrete frequency.
3. **ATC Frequency Change Procedures:**
    a. The following phraseology will be used by controllers to effect a frequency change:
    EXAMPLE:
    (Aircraft Identification) CONTACT (facility name or location name and terminal function) (frequency) AT (time, fix or altitude) OVER.
    NOTE: Pilots are expected to maintain a listening watch on the transferring controller's frequency until the time. fix or altitude specified. ATC will omit frequency change restrictions whenever pilot compliance is expected upon receipt.
    b. The following phraseology should be utilized by pilot for establishing contact with the designated facility:
        1. When a position report will be made:
        EXAMPLE:
        (Name) CENTER, (aircraft identification), (position), OVER.
        2. When no position report will be made:
        EXAMPLE:
        (Name) CENTER, (aircraft identification), ESTIMATING (reporting point and time) AT (altitude or flight level) CLIMBING (or descending) TO MAINTAIN (altitude or flight level) OVER.
        3. When operating in a radar environment and no position report is required:
        EXAMPLE:
        (Name) CENTER, (aircraft identification) AT (exact altitude or flight level); or, if appropriate,
        EXAMPLE:
        LEAVING (exact altitude or flight level) CLIMBING (or descending) TO MAINTAIN

(altitude or flight level) OVER.

NOTE: Exact altitude or flight level means to the nearest 100 foot increment. Exact altitude or flight level reports on initial contact provide ATC with information required prior to using MODE C altitude information for separation purposes.

c. At times controllers will ask pilots to verify that they are at a particular altitude. The phraseology used will be: "VERIFY AT (altitude)." In climbing or descending situations, controllers may ask pilots to "VERIFY ASSIGNED ALTITUDE AS (altitude)." Pilots should confirm that they are at the altitude stated by the controller or that the assigned altitude is correct as stated. If this is not the case, they should inform the controller of the actual altitude being maintained or the different assigned altitude.

CAUTION: Pilots should not take action to change their actual altitude or different assigned altitude to the altitude stated in the controllers verification request unless the controller specifically authorizes a change.

4. **ARTCC Radio Frequency Outage:**

   a. ARTCCs normally have at least one back up radio receiver and transmitter system for each frequency which can usually be placed into service quickly with little or no disruption of ATC service. Occasionally, technical problems may cause a delay but switchover seldom takes more than 60 seconds. When it appears that the outage will not be quickly remedied, the ARTCC will usually request a nearby aircraft, if there is one, to switch to the affected frequency to broadcast communications instructions. It is important, therefore. that the pilot wait at least 1 minute before deciding that the ARTCC has actually experienced a radio frequency failure. When such an outage does occur. the pilot should, if workload and equipment capability permit, maintain a listening watch on the affected frequency while attempting to comply with the following recommended communications procedures:

      1. If two-wave communications cannot be established with the ARTCC after changing frequencies, a pilot should attempt to recontact the transferring controller for the assignment of an alternative frequency or other instructions.
      2. When an ARTCC radio frequency failure occurs after two-way communications have been established, the pilot should attempt to reestablish contact with the center on any other known ARTCC frequency, preferably that of the next responsible sector when practicable, and ask for instructions. However, when the next normal frequency change along the route is known to involve another ATC facility, the pilot should contact that facility, if feasible, for instructions. If communications cannot be reestablished by either method, the pilot is expected to request communications instructions from the FSS appropriate to the route of flight.

   NOTE: The exchange of information between an aircraft and an ARTCC through an FSS is quicker than relay via company radio because the FSS has direct interphone lines to the responsible ARTCC sector. Accordingly, when circumstances dictate a choice between the two, during an ARTCC frequency outage, relay via FSS radio is recommended.

AIRCRAFT CALL SIGNS

a. **Precautions in the Use of Call Signs.**

   1. Improper use of call signs can result in pilots executing a clearance intended for another aircraft. Call signs should *never be abbreviated on an initial contact or at any time when other aircraft call signs have similar numbers/sounds or identical letters/numbers* (e.g., Cessna 6132F, Cessna 1622F, Baron 123F, Cherokee 7732F, etc.).

      EXAMPLE:

      Assume that a controller issues an approach clearance to an aircraft at the bottom of a holding stack and an aircraft with a similar call sign (at the top of the stack) acknowledges the clearance with the last two or three numbers of his call sign. If the aircraft at the bottom of the stack did not hear the

clearance and intervene, flight safety would be affected, and there would be no reason for either the controller or pilot to suspect that anything is wrong. This kind of "human factors" error can strike swiftly and is extremely difficult to rectify.

2. Pilots; therefore, must be certain that aircraft identification is complete and clearly identified before taking action on an ATC clearance. ATC specialists will not abbreviate call signs of an air carrier or other civil aircraft having authorized call signs. ATC specialist may initiate abbreviated call signs of other aircraft by using the *prefix and the last three digits/letters* of the aircraft identification after communications are established. The pilot may use the abbreviated call sign in subsequent contact with the ATC specialist. When aware of similar/identical call signs, ATC specialists will take action to minimize errors by emphasizing certain numbers/letters, by repeating the entire call sign, repeating the prefix, or by asking pilots to use a different call sign temporarily. Pilots should use the phrase "VERIFY CLEARANCE FOR (your complete call sign)" if doubt exists concerning proper identity.
3. Civil aircraft pilots should state the aircraft type, model or manufacturers name followed by the digits/letters of the registration number. When the aircraft manufacturer's name or model is stated, the prefix "N" is dropped (e.g. Aztec Two Four Six Four Alpha).
   EXAMPLE:
   BONANZA SIX FIVE FIVE GOLF.
   EXAMPLE:
   BREEZY SIX ONE THREE ROMEO EXPERIMENTAL (omit "Experimental" after initial contact).
4. Air Taxi or other commercial operators not having FAA authorized call signs should prefix their normal identification with the phonetic word 'Tango".
   EXAMPLE:
   TANGO AZTEC TWO FOUR SIX FOUR ALPHA.
5. air carriers and commuter air carriers having FAA authorized call signs should identify themselves by stating the complete call sign, using group form for the numbers and word "heavy" if appropriate.
   EXAMPLE:
   UNITED TWENTY-FIVE HEAVY.
   EXAMPLE:
   MIDWEST COMMUTER SEVEN ELEVEN.
6. Military aircraft use a variety of systems including serial numbers, word call signs and combinations of letters/numbers. Examples include Army Copter 48931, Air Force 61182, MAC 31792, Pat 157, Air Evac 17652, Navy Golf Alfa Kilo 21, Marine 4 Charlie 36, etc.

b. **Air Ambulance Flights.**

1. Civilian air ambulance flights responding to medical emergencies (carrying patients, organ donors, organs, or other urgently needed lifesaving medical material) will be expedited by ATC when necessary. When expeditious handling is required, add the word "LIFEGUARD" in the remarks of the flight plan. In radio communication, use the call sign "LIFEGUARD" followed by the aircraft type and registration letters/numbers. When requested by the pilot, necessary notification to expedite ground handling of patients, etc., is provided by ATC; however, when possible, this information should be passed in advance through non-ATC communications systems. Extreme discretion is necessary in using the term "LIFEGUARD." It is intended only for those missions of an urgent medical nature and for use only for that portion of the flight requiring expedited handling.
2. Similar provisions have been made for the use of "AIR EVAC" and "MED EVAC" by military air ambulance flights, except that these military flights will receive priority handling only when specifically requested.
   EXAMPLE:
   LIFEGUARD CESSNA TWO SIX FOUR SIX.

c. **Student Pilots Radio Identification.**

1. The FAA desires to help the student pilot in acquiring sufficient practical experience in the

environment in which he will be required to operate. To receive additional assistance while operating in areas of concentrated air traffic, a student pilot need only identify himself as a student pilot during his initial call to an FAA radio facility.
EXAMPLE:
DAYTON TOWER, THIS IS FLEETWING 1234, STUDENT PILOT, OVER.

2. This special identification will alert FAA ATC personnel and enable them to provide the student pilot with such extra assistance and consideration as he may nee. This procedure is not mandatory.

Description of Interchange or Leased Aircraft

a. Controllers issue traffic information based on familiarity with airline equipment and color/markings. When an air carrier dispatches a flight using another company's equipment and the pilot does not advise the terminal ATC facility, the possible confusion in aircraft identification can compromise safety.
b. Pilots flying an "interchange" or "leased" aircraft not bearing the colors/markings of the company operating the aircraft should inform the terminal ATC facility on the first contact the name of the operating company and trip number, followed by the company name as displayed on the aircraft, and aircraft type.
EXAMPLE
AIR CAL 311, UNITED (INTERCHANGE/LEASE), BOEING 727,

GROUND STATION CALL SIGNS

Pilots, when calling a ground station, should begin with the name of the facility being called followed by the type of the facility being called, as indicated in the following examples.

- Airport Unicom - "Shannon Unicom"
- FAA Flight Service Station - "Chicago Radio"
- FAA Flight Service Station (En Route Flight Advisory Service (Weather) - "Seattle Flight Watch"
- Airport Traffic Control Tower - "Augusta Tower"
- Clearance Delivery Position (IFR) - "Dallas Clearance Delivery"
- Ground Control Position in Tower - "Miami Ground"
- Radar or Nonradar Approach Control Position - "Oklahoma City Approach"
- Radar Departure Control Position - "St. Louis Departure"
- Faa Air Route Traffic Control Center - "Washington Center"

PHONETIC ALPHABET

The international Civil Aviation Organization (ICAO) phonetic alphabet is used by FAA personnel when communications conditions are such the the information cannot be readily received withour their use. ATC facilities may also request pilots to use phonetic letter equivalents when aircraft wiht similar sounding identifications are receiving communications on the same frequency. Pilots should use the phonetic alphabet when idetifying their aircraft during initial contact with air traffic control facilities. Additionall use the phonetic equivalents for single letters and to spell out groups of letters or difficult sords during adverse communications conditions.

CHARTER	MORSE CODE	TELEPHONY	PHONIC (PRONUNCIATION)
A	o -	Alfa	(AL-FAH)
B	o o o	Bravo	(BRAH-VOH)
C	- o - o	Charlie	(CHAR-LEE) or (SHAR-LEE)
D	- o o	Delta	(DELL-TAH)
E	o	Echo	(ECK-OH)

F	o o - o	Foxtrot	(FOKS-TROT)
G	- - o	Golf	(GOLF)
H	o o o o	Hotel	(HOH-TEL)
I	o o	India	(IN-DEE-AH)
J	o - - -	Juliett	(JEW-LEE-ETT)
K	- o -	Kilo	(KEY-LOH)
L	o - o o	Lima	(LEE-MAH)
M	- -	Mike	(MIKE)
N	- o	November	(NO-VEM-BER)
O	- - -	Oscar	(OSS-CAH)
P	o - - o	Papa	(PAH-PAH)
Q	- - o -	Quebec	(KEH-BECK)
R	o - o	Romeo	(ROW-ME-OH)
S	o o o	Sierra	(SEE-AIR-RAH)
T	-	Tango	(TANG-GO)
U	o o -	Uniform	(YOU-NEE-FORM) or (OO-NEE-FORM)
V	o o o -	Victor	(VIK-TAH)
W	o - -	Whiskey	(WISS-KEY)
X	- o o -	Xray	(ECKS-RAY)
Y	- o - -	Yankee	(YANG-KEY)
Z	- - o o	Zulu	(ZOO-LOO)
1	o - - - -	One	(WUN)
2	o o - - -	Two	(TOO)
3	o o o - -	Three	(TREE)
4	o o o o -	Four	(FOW-ER)
5	o o o o o	Five	(FIFE)
6	- o o o o	Six	(SIX)
7	- - o o o	Seven	(SEV-EN)
8	- - - o o	Eight	(AIT)
9	- - - - o	Nine	(NIN-ER)
0	- - - - -	Zero	(ZEE-RO)

FIGURES

a. Figures indication hundred and thousands in round number, as for ceiling heights, and upper wind levels up to 9900 shall be spoken in accordance with the following:
EXAMPLE:
500 - FIVE HUNDRED
EXAMPLE:
4500 - FOUR THOUSAND FIVE HUNDRED

b. Numbers above 9900 shall be spoken by separating the digits preceding the word "thousand."
EXAMPLE:
10,000 - ONE ZERO THOUSAND
EXAMPLE:
13,500 - ONE THREE THOUSAND FIVE HUNDRED

c. Transmit airway or jet route numbers as follows:
EXAMPLE:
V12 - VICTOR TWELVE
EXAMPLE:
J533 - J FIVE THIRTY-THREE

d. All other numbers shall be transmitted by pronouncing each digit.
EXAMPLE:
10 - ONE ZERO

e. When a radio frequency contains a decimal point, the decimal point is spoken as "POINT."
EXAMPLE:
122.1 - ONE TWO TWO POINT ONE

NOTE: ICAO Procedures require the decimal point be spoken as "DECIMAL" and FAA will honor such usage by military aircraft and all other aircraft required to use ICAO Procedures.

ALTITUDES AND FLIGHT LEVELS

a. Up to but not including 18,000 feet MSL - state the separate digits of the thousands, plus the hundreds, if appropriate.
   EXAMPLE:
   12,000 - ONE TWO THOUSAND
   EXAMPLE:
   12,500 - ONE TWO THOUSAND FIVE HUNDRED
b. At and above 18,000 feet MSL (FL 180) state the words "flight level" followed by the separate digits of the flight level.
   EXAMPLE:
   190 - FLIGHT LEVEL ONE NINER ZERO

DIRECTIONS

The three digits of bearing, course, heading or wind direction should always be magnetic. The word "true" must be added when it applies.
EXAMPLE:
(magnetic course) 005 - ZERO ZERO FIVE
EXAMPLE:
(true course) 050 - ZERO FIVE ZERO TRUE
EXAMPLE:
(magnetic bearing) 360 - THREE SIX ZERO
EXAMPLE:
(magnetic heading) 100 - ONE ZERO ZERO
EXAMPLE:
(wind direction) 220 - TWO TWO ZERO

SPEEDS

The separate digits of the speed followed by the word "KNOTS." Except, controllers may omit the word "KNOTS" when using speed adjustment procedures, e.g., "REDUCE/INCREASE SPEED TO TWO FIVE ZERO."
EXAMPLES:
(speed) 250 - TWO FIVE ZERO KNOTS
(speed) 190 - ONE NINER ZERO KNOTS

The separate digits of the mach number preceded by "MACH."
EXAMPLES:
(mach number) 1.5 - MACH ONE POINT FIVE
(mach number) .64 - MACH POINT SIX FOUR
(mach number) .7 - MACH POINT SEVEN

TIME

a. FAA used Greenwich Mean Time (GMT or Z) for all operations.
b. To convert from Standard Time to Greenwich Mean Time:
   Eastern Standard Time - Add 5 hours
   Central Standard Time - Add 6 hours
   Mountain Standard Time - Add 7 hours

Pacific Standard Time - Add 8 hours
Note: For Daylight Time subtract 1 hour.

c. The 24-hour clock system is used in radiotelephone transmissions. The hour is indicated by the first two figures and the minutes by the last two figures.
   EXAMPLE:
   0000 - ZERO ZERO ZERO ZERO
   EXAMPLE:
   0920 - ZERO NINER TWO ZERO
d. Time may be stated in minutes only (two figures) in radio telephone communications when no misunderstanding is likely to occur.
e. Current time in use at a station is stated in the nearest quarter minute in order that pilots may use this information for time checks. Fractions of a quarter minute less than eight seconds are stated as the preceding quarter minute; fractions of a quarter minute of eight seconds or more are stated as the succeeding quarter minute.
   EXAMPLE:
   0929:05 - TIME, ZERO NINER TWO NINER
   EXAMPLE:
   0929:10 - TIME, ZERO NINER TWO NINER AND ONE-QUARTER

COMMUNICATIONS WITH TOWER WHEN AIRCRAFT TRANSMITTER OR RECEIVER OR BOTH ARE INOPERATIVE

a. **Arriving Aircraft**
   1. Receiver inoperative - If you have reason to believe your receiver is inoperative, remain outside or above the airport traffic area until the direction and flow of traffic has been determined, then advise the tower of your type aircraft, position, altitude, intention to land and request that you be controlled with light signals. When you are approximately 3 to 5 miles from the airport, advise the tower of your position and join the airport traffic pattern. From this point on, watch the tower for light signals. Thereafter, if a complete pattern is made, transmit your position downwind and/or turning base leg.
   2. Transmitter inoperative - Remain outside or above the airport traffic area until the direction and flow of traffic has been determined, then join the airport traffic pattern. Monitor the primary local control frequency as depicted on Sectional Charts for landing or traffic information, and look for a light signal which may be addressed to your aircraft. During hours of daylight, acknowledge tower transmissions or light signals be rocking your wings. At night, acknowledge by linking the landing or navigation lights.
   3. Transmitter and receiver inoperative - Remain outside or above the airport traffic area until the direction and flow of traffic has been determined, then join the airport traffic pattern and maintain visual contact with the tower to receive light signals. Acknowledge light signals as noted above.

b. **Departing Aircraft**
   1. If you experience radio failure prior to leaving the parking area, make every effort to have the equipment repaired. If you are unable to have the malfunction repaired, call the tower by telephone and request authorization to depart without two-way radio communications. If tower authorization is granted, you will be given departure information and requested to monitor the tower frequency or watch for light signals, as appropriate. During daylight hours, acknowledge tower transmissions or light signals by moving the ailerons or rudder. At night, acknowledge by blinking the landing or navigation lights. If radio malfunction occurs after departing the parking area, watch the tower for light signals or monitor tower frequency.
      NOTE: Refer to FAR-91.87 and FAR-91.77.

TRAFFIC CONTROL LIGHT SIGNALS

a. The following procedures are used by ATCTs in the control of aircraft not equipped with radio. These same procedures will be used to control aircraft equipped with radio if radio contact cannot be established. ATC personnel use a directive traffic control signal which emits an intense narrow light beam of a selected color (either red, white, or green) when controlling traffic by light signals.

b. Although the traffic signal light offers the advantage that some control may be exercised over nonradio equipped aircraft, pilots should be cognizant of the disadvantages which are:
   1. The pilot may not be looking at the control tower at the time a signal is directed toward him.
   2. The directions transmitted by a light signal are very limited since only approval or disapproval of a pilot's anticipated actions may be transmitted. No supplement or explanatory information may be transmitted except by the use of the "General Warning Signal" which advises the pilot to be on the alert.

c. Between sunset and sunrise, a pilot wishing to attract the attention to the control tower should turn on a landing light and taxi the aircraft into a position, clear of the active runway. so that light is visible to the tower. The landing light should remain on until appropriate signals are received from the tower.

d. Portable traffic control light signals:

Color and Type of Signal	On the Ground	In Flight
STEADY GREEN	Cleared for take-off	Cleared to land
FLASHING GREEN	Cleared to taxi	Return for landing (to be followed by steady green at proper time)
STEADY RED	Stop	Give way to other aircraft and continue circling
FLASHING RED	Taxi clear of landing area (runway) is use	Airport unsafe-do not land
FLASHING WHITE	Return to starting point on airport	
ALTERNATING RED $ GREEN	General Warning Signal-Exercise Extreme Caution	General Warning Signal-Exercise Extreme Caution

e. During daylight hours, acknowledge tower transmissions or light signals by moving the ailerons or rudder. At night, acknowledge by blinking the landing or navigation lights. If radio malfunction occurs after departing the parking area. Watch the tower for light signals or monitor tower frequency.

COMMUNICATIONS FOR VFR FLIGHTS

a. FSSs are allocated frequencies for different functions, for airport Advisory Service the pilot should contact the FSS on 123.6 MHz, for example. Other FSS frequencies are listed with the FSS in the airport/Facility Directory. If you are in doubt as to what frequency to use to contact an FSS, transmit on

122.1 MHz and advise them of the frequency you are receiving on.

b. On VFR flights, guard the voice channel of VORs for broadcasts and calls from FAA FSSs. Where the VOR voice channel is being utilized for ATIS broadcasts, pilots of VFR flights are urged to guard the voice channel of an adjacent VOR. When in contact with a control facility, notify the controller if you plan to leave the frequency. That could save the controller time by not trying to call you on that frequency.

EMERGENCY COMMUNICATION
EMERGENCY LOCATOR TRANSMITTERS

a. **GENERAL**
Emergency locator Transmitters (ELT's) are required for most general aviation airplanes (FAR 91.52). ELT's of various types have been developed as a means of locating downed aircraft. These electronic, battery operated transmitters emit a distinctive downward swept audio tone on 121.5 Mhz and 243.0 MHz. If "armed" and when subject to crash generated forces, they are designed to automatically activate and continuously emit these signals. The transmitters will operate (continuously for at least 48 hours over a wide temperature range. A properly installed and maintained ELT can expedite search and rescue operations and save lives.

b. **TESTING**
ELT's should be tested in accordance with the manufacturer's instructions, preferably in a shielded or screened room to prevent the broadcast of signals which could trigger a false alert. "When this cannot be done, aircraft operational testing is authorized on 121.5 MHz and 243.0 Mhz as follows :
   1. Tests should be conducted only during the first 5 minutes after any hour. If operational tests must be made outside of this time frame, they should be coordinated with the nearest FAA Control Tower or FSS.
   2. Tests should be no longer than three audible sweeps.
   3. If the antenna is removable, a dummy load should be substituted during test procedures.
   4. Airborne tests are not authorized.

c. **FALSE ALARMS**
Caution should be exercised to prevent the inadvertent activation of ELT's in the air or while they are being handled on the ground. Accidental or unauthorized activation will generate an emergency signal that cannot be distinguished from the real thing, leading to expensive and frustrating searches. A false ELT signal could also interfere with genuine emergency transmissions and hinder or prevent the timely location of crash sites. Frequent false alarms could also result in complacency and decrease the vigorous reaction that must be attached to all ELT signals. Numerous cases of inadvertent activation have occurred as a result of aerobatics, hard landings, movement by ground crews, and aircraft maintenance. These false alarms can be minimized by monitoring 121.5 MHz and/or 243.0 MHz as follows:
   1. Prior to engine shut down at the end of each flight.
   2. When the ELT is handled during installation or maintenance.
   3. When maintenance is being performed in the vicinity of the ELT.
   4. When the aircraft is moved by a ground crew.
   5. If an ELT signal is heard, turn off the ELT to determine if it is transmitting. If it has heen activated, maintenance might be required before the unit is returned to the "ARMED" position.

d. **IN-FLIGHT MONITORING AND REPORTING**
Pilots are encouraged to monitor 121.5 MHz and/or 243.0 MHz while in flight to assist in identifying possible emergency ELT transmissions. On receiving a signal, report the following information to the nearest air traffic facility:
   1. Your position at the time the signal was first heard.
   2. Your position at the time the signal was last heard.
   3. Your position at maximum signal strength.
   4. Your flight altitudes and frequency on which the emergency signal was heard - 121.5 MHz or 243.0 MHz. If possible positions should be given relative to a navigation aid. If the aircraft has homing

equipment, provide the bearing to the emergency signal with each reported position.

SEARCH AND RESCUE SATELLITE (SARSAT)

Search and rescue is a lifesaving service provided through the combined efforts of the federal agencies signatory to the national search and rescue plan, and the agencies responsible for search and rescue in each state. Operational resources are provided by the U.S. Coast Guard, Department of Defense components, the Civil Air Patrol, the Coast Guard Auxiliary, state, county, and local law enforcement and other public safety agencies. The introduction of the SARSAT system enhances the effectiveness of search and rescue. SARSAT also amplifies the importance of assuring that your ELT remains silent, except for testing or in an actual emergency. Search and rescue missions launched because of a FALSE ELT signal are costly and unnecessary. Search and rescue services include search for missing aircraft, survival aid, rescue, and emergency medical help for the occupants after an accident site is located.

Check your radio on 121.5 MHz or 243.0 MHz before you leave your aircraft. Your ELT may be transmitting.

(END OF DOCUMENT FAA-P-8740-47 AFO-800-0385)

Section 3. Distress and Urgency Procedures

6-3-1. Distress and Urgency Communications

a. A pilot who encounters a *distress* or *urgency* condition can obtain assistance simply by contacting the air traffic facility or other agency in whose area of responsibility the aircraft is operating, stating the nature of the difficulty, pilot's intentions and assistance desired. *Distress* and *urgency* communications procedures are prescribed by the International Civil Aviation Organization (ICAO), however, and have decided advantages over the informal procedure described above.

b. *Distress* and *urgency* communications procedures discussed in the following paragraphs relate to the use of air ground voice communications.

c. The initial communication, and if considered necessary, any subsequent transmissions by an aircraft in *distress* should begin with the signal MAYDAY, preferably repeated three times. The signal PAN-PAN should be used in the same manner for an *urgency* condition.

d. *Distress* communications have absolute priority over all other communications, and the word MAYDAY commands radio silence on the frequency in use. *Urgency* communications have priority over all other communications except *distress,* and the word PAN-PAN warns other stations not to interfere with *urgency* transmissions.

e. Normally, the station addressed will be the air traffic facility or other agency providing air traffic services, on the frequency in use at the time. If the pilot is not communicating and receiving services, the station to be called will normally be the air traffic facility or other agency in whose area of responsibility the aircraft is operating, on the appropriate assigned frequency. If the station addressed does not respond, or if time or the situation dictates, the *distress* or *urgency* message may be broadcast, or a collect call may be used, addressing "Any Station (Tower)(Radio)(Radar)."

f. The station addressed should immediately acknowledge a *distress* or *urgency*

message, provide assistance, coordinate and direct the activities of assisting facilities, and alert the appropriate search and rescue coordinator if warranted. Responsibility will be transferred to another station only if better handling will result.

g. All other stations, aircraft and ground, will continue to listen until it is evident that assistance is being provided. If any station becomes aware that the station being called either has not received a *distress* or *urgency* message, or cannot communicate with the aircraft in difficulty, it will attempt to contact the aircraft and provide assistance.

h. Although the frequency in use or other frequencies assigned by ATC are preferable, the following emergency frequencies can be used for distress or urgency communications, if necessary or desirable:

1. ***121.5 MHz and 243.0 MHz.*** Both have a range generally limited to line of sight. 121.5 MHz is guarded by direction finding stations and some military and civil aircraft. 243.0 MHz is guarded by military aircraft. Both 121.5 MHz and 243.0 MHz are guarded by military towers, most civil towers, FSS's, and radar facilities. Normally ARTCC emergency frequency capability does not extend to radar coverage limits. If an ARTCC does not respond when called on 121.5 MHz or 243.0 MHz, call the nearest tower or FSS.

2. ***2182 kHz.*** The range is generally less than 300 miles for the average aircraft installation. It can be used to request assistance from stations in the maritime service. 2182 kHz is guarded by major radio stations serving Coast Guard Rescue Coordination Centers, and Coast Guard units along the sea coasts of the U.S. and shores of the Great Lakes. The call "Coast Guard" will alert all Coast Guard Radio Stations within range. 2182 kHz is also guarded by most commercial coast stations and some ships and boats.

6-3-2. Obtaining Emergency Assistance

a. A pilot in any *distress* or *urgency* condition should *immediately* take the following action, not necessarily in the order listed, to obtain assistance:

1. Climb, if possible, for improved communications, and better radar and direction finding detection. However, it must be understood that unauthorized climb or descent under IFR conditions within controlled airspace is prohibited, except as permitted by 14 CFR Section 91.3(b).

2. If equipped with a radar beacon transponder (civil) or IFF/SIF (military):

> **(a)** Continue squawking assigned Mode A/3 discrete code/VFR code and Mode C altitude encoding when in radio contact with an air traffic facility or other agency providing air traffic services, unless instructed to do otherwise.
>
> **(b)** If unable to immediately establish communications with an air traffic facility/agency, squawk Mode A/3, Code 7700/Emergency and Mode C.

3. Transmit a *distress* or *urgency* message consisting of *as many* as necessary of the following elements, preferably in the order listed:

> **(a)** If distress, MAYDAY, MAYDAY, MAY-DAY; if *urgency*, PAN-PAN, PAN-PAN, PAN-PAN.
>
> **(b)** Name of station addressed.
>
> **(c)** Aircraft identification and type.
>
> **(d)** Nature of *distress* or *urgency*.
>
> **(e)** Weather.
>
> **(f)** Pilots intentions and request.
>
> **(g)** Present position, and heading; or if *lost*, last known position, time, and heading since that position.

(h) Altitude or flight level.

(i) Fuel remaining in minutes.

(j) Number of people on board.

(k) Any other useful information.

REFERENCE-

Pilot/Controller Glossary Term- Fuel Remaining.

b. After establishing radio contact, comply with advice and instructions received. Cooperate. Do not hesitate to ask questions or clarify instructions when you do not understand or if you cannot comply with clearance. Assist the ground station to control communications on the frequency in use. Silence interfering radio stations. Do not change frequency or change to another ground station unless absolutely necessary. If you do, advise the ground station of the new frequency and station name prior to the change, transmitting in the blind if necessary. If two-way communications cannot be established on the new frequency, return immediately to the frequency or station where two-way communications last existed.

c. When in a distress condition with bailout, crash landing or ditching imminent, take the following additional actions to assist search and rescue units:

1. Time and circumstances permitting, transmit as many as necessary of the message elements in subparagraph a3 above, and any of the following that you think might be helpful:

(a) ELT status.

(b) Visible landmarks.

(c) Aircraft color.

(d) Number of persons on board.

(e) Emergency equipment on board.

2. Actuate your ELT if the installation permits.

3. For bailout, and for crash landing or ditching if risk of fire is not a consideration, set your radio for continuous transmission.

4. If it becomes necessary to ditch, make every effort to ditch near a surface vessel. If time permits, an FAA facility should be able to get the position of the nearest commercial or Coast Guard vessel from a Coast Guard Rescue Coordination Center.

5. After a crash landing, unless you have good reason to believe that you will not be located by search aircraft or ground teams, it is best to remain with your aircraft and prepare means for signaling search aircraft.

6-3-3. Ditching Procedures

FIG 6-3-1

Single Swell (15 knot wind)

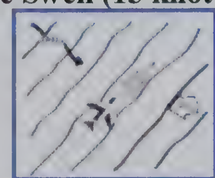


FIG 6-3-2

Double Swell (15 knot wind)

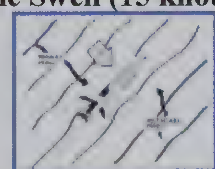


FIG 6-3-3

Double Swell (30 knot wind)

FIG 6-3-4

(50 knot wind)

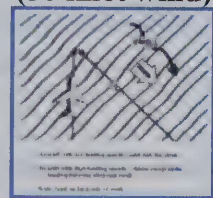
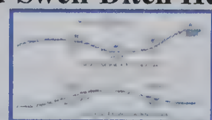


FIG 6-3-5

Wind-Swell-Ditch Heading



a. A successful aircraft ditching is dependent on three primary factors. In order of importance they are:

1. Sea conditions and wind.

2. Type of aircraft.

3. Skill and technique of pilot.

b. Common oceanographic terminology.

1. Sea. The condition of the surface that is the result of both waves and swells.

2. Wave (or Chop). The condition of the surface caused by the local winds.

3. Swell. The condition of the surface which has been caused by a distance disturbance.

4. Swell Face. The side of the swell toward the observer. The backside is the side away from the observer. These definitions apply regardless of the direction of swell movement.

5. Primary Swell. The swell system having the greatest height from trough to crest.

6. Secondary Swells. Those swell systems of less height than the primary swell.

7. Fetch. The distance the waves have been driven by a wind blowing in a constant direction, without obstruction.

8. Swell Period. The time interval between the passage of two successive crests at the same spot in the water, measured in seconds.

9. Swell Velocity. The speed and direction of the swell with relation to a fixed reference point, measured in knots. There is little movement of water in the horizontal direction. Swells move primarily in a vertical motion, similar to the motion observed when

shaking out a carpet.

10. Swell Direction. The direction *from* which a swell is moving. This direction is not necessarily the result of the wind present at the scene. The swell may be moving into or across the local wind. Swells, once set in motion, tend to maintain their original direction for as long as they continue in deep water, regardless of changes in wind direction.

11. Swell Height. The height between crest and trough, measured in feet. The vast majority of ocean swells are lower than 12 to 15 feet, and swells over 25 feet are not common at any spot on the oceans. Successive swells may differ considerably in height.

c. In order to select a good heading when ditching an aircraft, a basic evaluation of the sea is required. Selection of a good ditching heading may well minimize damage and could save your life. It can be extremely dangerous to land into the wind without regard to sea conditions; the swell system, or systems, must be taken into consideration. Remember one axiom- ***AVOID THE FACE OF A SWELL.***

1. In ditching parallel to the swell, it makes little difference whether touchdown is on the top of the crest or in the trough. It is preferable, however, to land on the top or back side of the swell, if possible. After determining which heading (and its reciprocal) will parallel the swell, select the heading with the most into the wind component.

2. If only one swell system exists, the problem is relatively simple- even with a high, fast system. Unfortunately, most cases involve two or more swell systems running in different directions. With more than one system present, the sea presents a confused appearance. One of the most difficult situations occurs when two swell systems are at right angles. For example, if one system is eight feet high, and the other three feet, plan to land parallel to the primary system, and on the down swell of the secondary system. If both systems are of equal height, a compromise may be advisable- select an intermediate heading at 45 degrees down swell to both

systems. When landing down a secondary swell, attempt to touch down on the back side, not on the face of the swell.

3. If the swell system is formidable, it is considered advisable, in landplanes, to accept more crosswind in order to avoid landing directly into the swell.

4. The secondary swell system is often from the same direction as the wind. Here, the landing may be made parallel to the primary system, with the wind and secondary system at an angle. There is a choice to two directions paralleling the primary system. One direction is downwind and down the secondary swell, and the other is into the wind and into the secondary swell, the choice will depend on the velocity of the wind versus the velocity and height of the secondary swell.

d. The simplest method of estimating the wind direction and velocity is to examine the windstreaks on the water. These appear as long streaks up and down wind. Some persons may have difficulty determining wind direction after seeing the streaks on the water. Whitecaps fall forward with the wind but are overrun by the waves thus producing the illusion that the foam is sliding backward. Knowing this, and by observing the direction of the streaks, the wind direction is easily determined. Wind velocity can be estimated by noting the appearance of the whitecaps, foam and wind streaks.

1. The behavior of the aircraft on making contact with the water will vary within wide limits according to the state of the sea. If landed parallel to a single swell system, the behavior of the aircraft may approximate that to be expected on a smooth sea. If landed into a heavy swell or into a confused sea, the deceleration forces may be extremely great-resulting in breaking up of the aircraft. Within certain limits, the pilot is able to minimize these forces by proper sea evaluation and selection of ditching heading.

2. When on final approach the pilot should look ahead and observe the surface of the sea. There may be shadows and whitecaps-signs of large seas. Shadows and whitecaps close together indicate short and rough seas. Touchdown in these areas is to be avoided. Select

and touchdown in any area (only about 500 feet is needed) where the shadows and whitecaps are not so numerous.

3. Touchdown should be at the l*owest* speed and rate of descent which permit safe handling and optimum nose up attitude on impact. Once first impact has been made, there is often little the pilot can do to control a landplane.

e. Once preditching preparations are completed, the pilot should turn to the ditching heading and commence let-down. The aircraft should be flown low over the water, and slowed down until ten knots or so above stall. At this point, additional power should be used to overcome the increased drag caused by the nose up attitude. When a smooth stretch of water appears ahead, cut power, and touchdown at the best recommended speed as fully stalled as possible. By cutting power when approaching a relatively smooth area, the pilot will prevent overshooting and will touchdown with less chance of planing off into a second uncontrolled landing. Most experienced seaplane pilots prefer to make contact with the water in a semi-stalled attitude, cutting power as the tail makes contact. This technique eliminates the chance of misjudging altitude with a resultant heavy drop in a fully stalled condition. Care must be taken not to drop the aircraft from too high altitude or to balloon due to excessive speed. The altitude above water depends on the aircraft. Over glassy smooth water, or at night without sufficient light, it is very easy, for even the most experienced pilots to misjudge altitude by 50 feet or more. Under such conditions, carry enough power to maintain nine to twelve degrees nose up attitude, and 10 to 20 percent over stalling speed until contact is made with the water. The proper use of power on the approach is of great importance. If power is available on one side only, a little power should be used to flatten the approach; however, the engine should not be used to such an extent that the aircraft cannot be turned against the good engines right down to the stall with a margin of rudder movement available. When near the stall, sudden application of excessive unbalanced power may result in loss of directional control. If power is available on one side only, a slightly higher than normal glide approach speed should be used. This will insure good control and some margin of speed after leveling off without excessive use of power. The use of power in ditching is so important that when it is certain that the coast cannot be reached, the pilot should, if possible, ditch before fuel is exhausted. The use of power in a night or instrument ditching is far more essential than under daylight contact conditions.

1. If no power is available, a greater than normal approach speed should be used down to the flare-out. This speed margin will allow the glide to be broken early and more gradually, thereby giving the pilot time and distance to feel for the surface - decreasing the possibility of stalling high or flying into the water. When landing parallel to a swell system, little difference is noted between landing on top of a crest or in the trough. If the wings of aircraft are trimmed to the surface of the sea rather than the horizon, there is little need to worry about a wing hitting a swell crest. The actual slope of a swell is very gradual. If forced to land into a swell, touchdown should be made just after passage of the crest. If contact is made on the face of the swell, the aircraft may be swamped or thrown violently into the air, dropping heavily into the next swell. If control surfaces remain intact, the pilot should attempt to maintain the proper nose above the horizon attitude by rapid and positive use of the controls.

f. After Touchdown. In most cases drift, caused by crosswind can be ignored; the forces acting on the aircraft after touchdown are of such magnitude that drift will be only a secondary consideration. If the aircraft is under good control, the "crab" may be kicked out with rudder just prior to touchdown. This is more important with high wing aircraft, for they are laterally unstable on the water in a crosswind and may roll to the side in ditching.

REFERENCE-
This information has been extracted from Appendix H of the "National Search and Rescue Manual."

6-3-4. Special Emergency (Air Piracy)

a. A special emergency is a condition of air piracy, or other hostile act by a person(s) aboard an aircraft, which threatens the safety of the aircraft or its passengers.

b. The pilot of an aircraft reporting a special emergency condition should:

1. If circumstances permit, apply *distress* or *urgency* radio-telephony procedures. Include the details of the special emergency.

REFERENCE-

2. If circumstances do not permit the use of prescribed *distress* or *urgency* procedures, transmit:

(a) On the air/ground frequency in use at the time.

(b) As many as possible of the following elements spoken distinctly and in the following order:

(1) Name of the station addressed (time and circumstances permitting).

(2) The identification of the aircraft and present position.

(3) The nature of the special emergency condition and pilot intentions (circumstances permitting).

(4) If unable to provide this information, use code words and/or transponder as follows:

Spoken Words TRANSPONDER SEVEN FIVE ZERO ZERO
Meaning I am being hijacked/forced to a new destination
Transponder Setting Mode 3/A, Code 7500

NOTE-
Code 7500 will never be assigned by ATC without prior notification from the pilot that the aircraft is being subjected to unlawful interference. The pilot should refuse the assignment of Code 7500 in any other situation and inform the controller

accordingly. Code 7500 will trigger the special emergency indicator in all radar ATC facilities.

c. Air traffic controllers will acknowledge and confirm receipt of transponder Code 7500 by asking the pilot to verify it. If the aircraft is not being subjected to unlawful interference, the pilot should respond to the query by broadcasting in the clear that the aircraft is not being subjected to unlawful interference. Upon receipt of this information, the controller will request the pilot to verify the code selection depicted in the code selector windows in the transponder control panel and change the code to the appropriate setting. If the pilot replies in the affirmative or does not reply, the controller will not ask further questions but will flight follow, respond to pilot requests and notify appropriate authorities.

d. If it is possible to do so without jeopardizing the safety of the flight, the pilot of a hijacked passenger aircraft, after departing from the cleared routing over which the aircraft was operating, will attempt to do one or more of the following things, insofar as circumstances may permit:

1. Maintain a true airspeed of no more than 400 knots, and preferably an altitude of between 10,000 and 25,000 feet.

2. Fly a course toward the destination which the hijacker has announced.

e. If these procedures result in either radio contact or air intercept, the pilot will attempt to comply with any instructions received which may direct the aircraft to an appropriate landing field.

6-3-5. Fuel Dumping

a. Should it become necessary to dump fuel, the pilot should immediately advise ATC. Upon receipt of information that an aircraft will dump fuel, ATC will broadcast or cause to be broadcast immediately and every 3 minutes thereafter the following on appropriate ATC and FSS radio frequencies:

EXAMPLE-

Attention all aircraft-fuel dumping in progress over-(location) at (altitude) by (type aircraft) (flight direction).

b. Upon receipt of such a broadcast, pilots of aircraft affected, which are not on IFR flight plans or special VFR clearances, should clear the area specified in the advisory. Aircraft on IFR flight plans or special VFR clearances will be provided specific separation by ATC. At the termination of the fuel dumping operation, pilots should advise ATC. Upon receipt of such information, ATC will issue, on the appropriate frequencies, the following:

EXAMPLE-
ATTENTION ALL AIRCRAFT-FUEL DUMPING BY-(type aircraft)-TERMINATED.

Satellite Navigation Product Teams

Frequently Asked Questions

GPS FAQ

WAAS FAQ

LAAS FAQ

NAS FAQ

Miscellaneous

Global Positioning System (GPS)

Q. What is GPS?

A. The Global Positioning System (GPS) is a satellite-based radionavigation system initially developed and operated by the U.S. Department of Defense (DOD). In 1996, a Presidential Decision Directive, later passed into law, transferred "ownership" from DOD to an Interagency GPS Executive Board (IGEB), co-chaired by senior officials of the Departments of Transportation and Defense to provide management oversight to assure that GPS meets civil and military user requirements. GPS permits land, sea, and airborne users to determine their three-dimensional position, velocity, and time 24 hours a day, in all weather, anywhere in the world with a precision and accuracy far better than other radionavigation systems available today or in the foreseeable future.

GPS consists of three segments: space, control, and user.

The Space Segment, consists of 24 operational satellites in six 12-hour orbits 20,200 km (10,900 ml) above the earth at an inclination angle of 55 degrees. The satellites are spaced in orbit so that at any time a minimum of 4 satellites will be in view to users anywhere in the world. The satellites continuously broadcast a low power, one way position and time signal to users throughout the world. There are currently 29 satellites in orbit, or five spares, which assures the availability of 24 operational satellites.

The Control Segment consists of a master control station in Colorado Springs, Colorado, with five monitor stations and three control up-link stations located throughout the world. Monitor stations track all GPS satellites in view and collect ranging information from the satellite broadcasts. This information is then sent back to the master control station, which computes extremely precise satellite orbits. The data is then formatted into updated navigation messages for each satellite. The updated information is transmitted to each satellite via the control up-link stations, which also transmit and receive satellite control and monitoring signals.

The User Segment consists of the receivers, processors, and antennas that allow land, sea, or airborne operators to receive the

GPS satellite broadcasts and compute their precise position, velocity and time.

Q. How is GPS used?

A. GPS receivers collect signals from satellites in view. They display the user's position, velocity, and time, as needed for their marine, terrestrial, or aeronautical applications. Some display additional data, such as distance and bearing to selected waypoints or digital charts.

The GPS concept of operation is based upon satellite ranging. Users determine their position by measuring their distance from the group of satellites in space. The satellites act as precise reference points.

Each GPS satellite transmits an accurate position and time signal. The user's receiver measures the time delay for the signal to reach the receiver, which is the direct measure of the apparent range (called a "pseudorange") to the satellite. Measurements collected simultaneously from four satellites are processed to solve for the three dimensions of position (latitude, longitude, and altitude) and time. Position measurements are in the worldwide WGS-84 geodetic reference system, and time is with respect to a worldwide common U.S. Naval Observatory Time (USNO) reference.

Q. Who uses GPS?

A. GPS is used to support land, sea, and airborne navigation, surveying, geophysical exploration, mapping and geodesy, vehicle location systems, farming, transportation systems, and a wide variety of other additional applications. Telecommunication infrastructure applications include network timing and enhanced 911 for cellular users. Global delivery of precise and common time to fixed and mobile users is one of the most important, but least appreciated functions of GPS.

Q. What's the status of the GPS?

A. The Global Positioning System reached Full Operational Capability (FOC) July 17, 1995. Per U.S. Policy and Law, the GPS Standard Positioning Service is available to civil users worldwide for their peaceful transportation, scientific, and other uses free of direct user charges.

Q. ***What is the Standard Positioning Service?***

A. GPS provides two levels of service: A Standard Positioning Service (SPS) for general civil use and an encoded Precise Positioning Service (PPS) primarily intended for use by the Department of Defense and U.S. allies. The SPS is the standard

specified level of positioning and timing accuracy that is available, without restrictions, to any user on a continuous worldwide basis.

SPS provides accuracies (for position, the accuracy with respect to geographic or geodetic coordinates of the Earth) within:

100 meters (2 drms) horizontal, 156 meters (2 Sigma) vertical, 300 meters (99.99% prob.) horizontal, 340 nanoseconds time (95% prob.).

SPS Coverage is continuous and worldwide, with a position dilution of precision (PDOP) of 6 or less.

These accuracy's reflect the last signal specification in the Federal Radionavigation Plan, the signal specification is in the process of being revised to reflect the accuracy obtained with Selective Availability (SA) turned off.

Q. What is Selective Availability (SA)?

A. SA was a technique to reduce the accuracy of unaugmented, single-receiver GPS measurements. This was accomplished by altering (or "dithering") the GPS satellite clock signals, and by modifying orbital elements of the broadcast navigation message. These alterations were done in a coded fashion, and could be removed by authorized users. This alteration caused horizontal positional errors on the order of 100 meters (95%), and varied in a manner that prevented rapid averaging of positional data.

Q. Why was SA Necessary?

A. SA was used to protect the security interests of the U.S. and its allies by globally denying the full accuracy of the civil system to potential adversaries.

Q. What is the status of Selective Availability (SA)?

A. By order of the President of the United States, the use of Selective Availability was discontinued on May 1, 2000.

Q. Will SA ever be turned back on?

A. It is not the intent of the U.S. to ever use SA again. To ensure that potential adversaries to do not use GPS, the military is dedicated to the development and deployment of regional denial capabilities in lieu of global degradation through SA.

Q. How can civil users depend on a system controlled by the U.S. military?

A. GPS is owned and operated by the U.S. Government as a national resource. DOD is the "steward" of GPS, and as such, is responsible to operate the system in accordance with the signal specification. The March 1996 Presidential Decision Directive, passed into law by Congress in 1998, essentially transferred "ownership" of GPS from DOD to the Interagency GPS Executive Board (IGEB). The IGEB is co-chaired by members of the Departments of Transportation and Defense, and comprised of members of the Departments of State, Agriculture, Commerce, Interior, and Justice as well as members from NASA and the Joint Chiefs of Staff. It allows for both civil and military interests to be included on all decisions related to the management of GPS.

DOD is required by law to "maintain a Standard Positioning Service (SPS) (as defined in the Federal Radionavigation Plan and the Standard Positioning Service Signal Specification) that will be available on a continuous, worldwide basis," and, "develop measures to prevent hostile use of GPS and its augmentations without unduly disrupting or degrading civilian uses." These strict requirements and current augmentation systems should actually make DOD use of the system transparent to the civil user. (Note: There will, necessarily, continue to be localized testing of the system by military and development teams but the testing will fall under strict notification guidelines of safety-of-life users such as Coast Guard and FAA).

U.S. transportation, public safety, economic, scientific, timing, and other users rely on GPS extensively. In aviation and maritime transportation, GPS is used for "safety of life" navigation and it is a critical system for these applications. DOD is the steward of the system, responsible to maintain the signal specification; the IGEB provides management oversight to assure that civil and military needs are properly balanced.

Q. How many GPS satellites are there?

A. The GPS system, at full Operational Capability (FOC), was designed for a minimum of 24 Satellites, 4 in each orbital plane. This produces the design probability that at least 4 satellites will be in view to users worldwide, over any 24-hour period, with a Position Dilution Of Precision (PDOP) of six or less, at least 99.9 percent of the time. The exact number of satellites operating at any one particular time varies based on the number of satellite outages and operational spares on orbit. For the current status of the GPS constellation, please visit http://tycho.usno.navy.mil/gpscurr.html

Q. What kind of orbits are the GPS satellites in?

A. The GPS satellites operate in circular 10,900nm (20,200km) 12-hour orbits at an inclination of 55 degrees. They are not in geo-stationary orbit.

Q. How do GPS accuracy and integrity compare to that of existing ground-based navigation systems such as VOR/DME?

A. The basic GPS signal is accurate on a worst-case basis to within approximately 100 meters lateral and 140 meters vertical everywhere on earth. GPS, as provided to civil users, appears to be just as accurate as the most accurate service being provided by the VOR/DME, i.e., non-precision approaches. It should be noted that VOR accuracy degrades as you move farther away from the navigation aid. GPS accuracy is space-based, and thus not constrained by ground equipment. The basic GPS signal is not as accurate as the existing ILSs; however, augmented by WAAS and LAAS, GPS will be able to supply a precision approach capability (CAT-I with WAAS and progressing to CAT-II/III with LAAS).

Q. Are there plans to increase the capabilities of GPS?

A. Yes, in January 1999, the Vice President announced that two new civil frequencies would be added to the current GPS constellation. Exact dates of the availability of this new capability will depend on several factors, including funding and the health of the existing satellites, which will govern the launch schedule. However, based on current projections, the first satellite with the 2nd civil frequency will likely be launched in 2003, and the first satellite with the 3rd civil frequency will likely be launched in 2005. These new civil signals will improve the robustness, accuracy and availability of GPS for users and will enable the development of a broad range of new and improved GPS applications. For more information on GPS modernization activities, please visit http://www.igeb.gov.

Q. When will the second and third civil frequencies be available?

A. On 1/25/99, Vice President Gore announced a $400 million dollar GPS modernization initiative that will include addition of "two new civil signals to future GPS satellites, significantly enhancing the service provided to civil, commercial, and scientific users worldwide." Located at 1227.60 MHz, "the presidents budget supports implementing this new signal on the satellites scheduled for launch beginning 2003." "Key to the modernization initiative was a recent White House decision on the frequency for a third civil signal that can meet the needs of critical safety-of-life applications such as civil aviation. The third civil signal will be located at 1176.45 MHz, within a portion of the spectrum that is allocated internationally for aeronautical radio-navigation services, and will be implemented beginning with a satellite scheduled for launch in 2005." "The date that new services will be available to users will depend on actual launch dates, orbiting sufficient numbers of satellites to provide useful services, and maintaining operational capabilities."

Q. How vulnerable are GPS satellites to jamming and interference?

A. GPS satellite signals, like any other navigation signals, are subject to some form of interference. The FAA is actively working with the U.S. Department of Defense and other U.S. Government Agencies to detect and mitigate these effects and make sure the basic GPS service and any related augmentation systems are available for civil users for safe aviation operations. As with all navigation aids, interference, whether intentional or unintentional, is always a concern. A number of methods for minimizing interference have been identified and tested and others are being investigated. The FAA is also working to make sure augmentation systems detect and mitigate these effects.

Q. What concerns are there regarding Radio Frequency Interference (RFI)?

A. As with all navigation aids, Radio Frequency Interference (RFI), unintentional or intentional is always a concern. We are evaluating several GPS interference detection systems, which will determine the direction and source of the GPS interference. The FAA is also working with DOD and other agencies to make sure that GPS augmentation systems detect and mitigate the effects of interference.

Q. Is the basic GPS signal sufficient to meet all the needs of civil aviation?

A. This is not a simple yes/no answer. The answer is that it depends on the service requirements of each user or aviation authority. For many countries, GPS supplies a better capability than the existing ground-based systems or lack thereof. Yet for other countries with large infrastructures, the GPS signal does not meet the accuracy, availability, and integrity requirements critical to safety of flight. Enhancements such as the Wide Area Augmentation system (WAAS) and Local Area Augmentation System (LAAS) provide the necessary corrections in order to meet these requirements.

Q. What is DGPS (Differential GPS)?

A. DGPS is a technique used to improve GPS accuracy by incorporating error corrections provided by a GPS monitoring station. The monitoring station calculates the corrections by comparing its known location with that reported by GPS. The difference between the two represents a "differential correction" that can be applied to result in a more accurate position than that provided by GPS alone.

Satellite Navigation Product Teams

Frequently Asked Questions

GPS FAQs

WAAS FAQs

LAAS FAQs

NAS FAQs

Miscellaneous

Wide Area Augmentation System (WAAS)

Q. What is WAAS?

A. The Wide Area Augmentation System (WAAS) uses a system of ground stations to provide necessary augmentations to the GPS SPS navigation signal. A network of precisely surveyed ground reference stations are strategically positioned across the country including Alaska, Hawaii, and Puerto Rico to collect GPS satellite data. Using this information, a message is developed to correct any signal errors. These correction messages are then broadcast through communication satellites to receivers onboard aircraft using the same frequency as GPS. The WAAS is designed to provide the additional accuracy, availability, and integrity necessary to enable users to rely on GPS for all phases of flight, from en route through GLS approach for all qualified airports within the WAAS coverage area. This will provide a capability for the development of more standardized precision approaches, missed approaches, and departure guidance for approximately 4,100 ends of runways and hundreds heliport/helipads in the NAS. WAAS will also provide the capability for increased accuracy in position reporting, allowing for more uniform and high-quality worldwide Air Traffic Management (ATM). In addition, WAAS will provide benefits beyond aviation to all modes of transportation, including maritime, highways, and railroads.

Q. What are the Air Traffic Control (ATC) Communication, Navigation, and Surveillance (CNS) benefits from WAAS?

A. Communication benefits:

While WAAS may not provide any direct benefits to ATC communications, it may be an enabling technology for the future aviation datalink architecture.

Navigation benefits:

Provides an alternative satellite-based system to maintain required levels of safe operations in the NAS. Upon completion of the end-state WAAS, will allow for replacement of VOR, DME, NDB, and most Category 1 ILS receivers with a single WAAS receiver.

Improved safety when operating in reduced weather conditions due to precision vertical guidance on approach 3-dimensional position guidance for all phases of flight

Provides an inexpensive, Instrument Flight Rules (IFR) area navigation system, with global coverage, leading to:

- Greater runway availability
- Reduced separation
- More direct en route paths
- New precision approach services
- Reduced disruptions (delays, diversions, or cancellations)

There are also significant benefits to be realized by the FAA due to the elimination of maintenance and replacement costs associated with some older, expensive ground-based navigation aids (to include NDB, VOR, DME, and most Category 1 ILSs).

Surveillance benefits:

The FAA currently has no funded programs to develop surveillance systems based on WAAS. However, proof of concepts for an Automatic Dependent Surveillance system, using positioning by aircraft Broadcasts (ADS-B), have been demonstrated within other FAA Research and Development efforts and may prove to be cost effective additions to the NAS.

Q. Will the WAAS provide a performance comparable to ILS? How will the FAA respond to users who claim to be getting poorer performance than ILS?

A.Yes. WAAS has been designed and is being built to provide performance comparable to Category 1 ILS. The Satellite Operational Implementation Team, or SOIT, believes that WAAS will provide an equivalent level of precision approach service to that of existing Category 1 ILS when fully deployed.

When the WAAS signal is fully stabilized, and the FAA accepts the system, we believe actually performance will exceed system specifications. Preliminary tests using WAAS software indicate that this is the case.

Q. Does the FAA plan to live up to its original commitment to deliver the WAAS program with the capability that was envisioned when initial funding was requested?

A. The FAA remains committed to the implementation of WAAS because of its safety benefits for the aviation community and the flying public, and because it is central to our overall efforts to modernize the NAS.

Q. What is the data collecting method for ionospheric data, solar activity, etc. to evaluate performance?

A. WAAS will collect GPS data at the reference stations. The system will then be able to estimate the amount of signal delay and error that is the result of the ionospheric and/or solar activity. This information is then passed onto the user as a part of the WAAS navigation message. The GPS Product Team is currently developing requirements for a performance evaluation system to monitor how well WAAS is accounting for these and other sources of delay/error.

In addition, ionospheric data is collected and archived by the NSTB for analysis of scintillation and range delay effects by experts in the ionospheric field.

Q. Who manages (and how) the safety analysis of the WAAS system including the ground component, RF Uplink system, and satellite component?

A. A Safety Working Group has been formed to continuously look into the safety performance/operation for WAAS (including all of the components - reference stations, uplink stations, and satellites). This working group is comprised of various representatives from the FAA, Raytheon, and Mitre Corporation.

Q. When will the WAAS receivers be available to the aviation public?

A. Commercial WAAS receivers for non-aviation use are available now. Certified public receivers should be available prior to WAAS commissioning. The receiver requirements have been developed and are currently available to the manufacturers. The receiver manufacturers, working with the FAA and RTCA, developed the requirements and will decide the right time to market GPS/WAAS products.

International Flight Information

General Information

U.S. Aeronautical Telecommunications Services

Services Available for Aircraft Engaged in International or Overseas Flight

a. The aeronautical voice communications stations listed are available to and utilized by the U FAA Air Route Traffic Control Centers (ARTCCs) for air traffic control purposes.

b. The frequencies in use will depend upon the time of day or night and conditions which affect ra wave propagation. Voice communications are handled on a single channel simplex basis (i.e., with t aircraft and the ground station using the same frequency for transmission and reception) unle otherwise noted in remarks.

c. The stations will remain on continuous watch for aircraft within their communication areas, a when practicable, will transfer this watch to another station when the aircraft reaches the limit of t communications area.

d. Stations listed below which are designated "FAA" are operated by the U.S. FAA Flight Serv Stations. Stations designated "ARINC" are operated by Aeronautical Radio, Incorporated, 2551 R Road, Annapolis, MD 21401. Contact the Air Traffic Communications Support Section at 410-26 4430, E:Mail AGOPS@arinc.com or cable HDQXGXA.

STATION AND OPERATING AGENCY	RADIO CALL	TRANSMITTING FREQUENCIES	REMARKS
HONOLULU (FAA)	Honolulu Radio	122.6 122.2 #121.5 MHz	#Emergency. Frequency 122.1 also available for receiving only.
	Volmet	2863 6679 8828 13282 kHz	Broadcasts at H+00-05 and H+30-35; Aerodrome Forecasts, Honolulu, Hilo, Agana, Honolulu. SIGMET. Hourly Report, Honolulu, Hilo, Kahului, Agana, Honolulu.
			Broadcasts at H+05-10 and H+35-40; Hourly Reports, San Francisco, Los Angeles, Seattle, Portland, Sacramento, Ontario, Las Vegas. SIGMET. Aerodrome Forecasts, San Francisco, Seattle, Los Angeles.
			Broadcasts at H+25-30 and H+55-60; Hourly Reports, Anchorage, Elmendorf, Fairbanks, Cold Bay, King Salmon, Vancouver. SIGMET. Aerodrome Forecasts, Anchorage, Fairbanks, Cold

			Bay, Vancouver.
STATION AND OPERATING AGENCY	**RADIO CALL**	**TRANSMITTING FREQUENCIES**	**REMARKS**
MIAMI (FAA)	Miami Radio	126.7 118.4 126.9 122.2 122.4 122.75 123.65 127.9 MHz	Local and Short Range.
		#121.5MHz	#Emergency.
STATION AND OPERATING AGENCY	**RADIO CALL**	**TRANSMITTING FREQUENCIES**	**REMARKS**
NEW YORK (FAA)	New York Radio (Volmet)	3485* 6604 10051 13270* kHz	*3485 Volmet broadcasts from 1 hour after sunset to 1 hour before sunrise.
			*13270 Volmet broadcasts from 1 hour before sunrise to 1 hour after sunset.
			Broadcasts at H+00-05; Aerodrome Forecasts, Detroit, Chicago, Cleveland. Hourly Reports, Detroit, Chicago, Cleveland, Niagara Falls, Milwaukee, Indianapolis.
			Broadcasts at H+05-10; SIGMET, (Oceanic-New York). Aerodrome Forecasts, Bangor, Pittsburgh, Charlotte. Hourly Reports, Bangor, Pittsburgh, Windsor Locks, St. Louis, Charlotte, Minneapolis.
			Broadcasts at H+10-15; Aerodrome Forecasts, New York, Newark, Boston. Hourly reports, New York, Newark, Boston, Baltimore, Philadelphia, Washington.
			Broadcasts at H+15-20; SIGMET (Oceanic-Miami/San Juan). Aerodrome Forecasts, Bermuda, Miami, Atlanta. Hourly Reports, Bermuda, Miami, Nassau, Freeport, Tampa,West Palm Beach, Atlanta.
			Broadcasts at H+30-35; Aerodrome Forecasts, Niagara Falls, Milwaukee, Indianapolis. Hourly Reports Detroit, Chicago, Cleveland, Niagara Falls, Milwaukee, Indianapolis.
			Broadcasts at H+35-40; SIGMET (Oceanic-New York). Aerodrome Forecasts, Windsor Locks, St. Louis. Hourly Reports, Bangor, Pittsburgh, Windsor Locks, St. Louis, Charlotte. Minneapolis.
			Broadcasts at H+40-45; Aerodrome

			Forecasts, Baltimore, Philadelphia, Washington. Hourly Reports, New York, Newark, Boston, Baltimore, Philadelphia, Washington.
			Juan). Aerodrome Forecasts, Nassau, Freeport. Hourly Reports, Bermuda, Miami, Nassau, Freeport, Tampa, West Palm Beach, Atlanta.
STATION AND OPERATING AGENCY	**RADIO CALL**	**TRANSMITTING FREQUENCIES**	**REMARKS**
NEW YORK (ARINC)	New York	3016 5598 8906 13306 17946 kHz	North Atlantic Family A Network.
		2962 6628 8825 11309 13354 kHz	North Atlantic Family E Network.
		2887 5550 6577 8918 11396 13297 kHz	Caribbean Family A Network.
	New York	3455 5520 6586 8846 11330 17907 kHz	Caribbean Family B Network.
		3494 6640 8933 11342 13330 17925 kHz	Long Distance Operations Control (LDOC) Service (phone-patch). Communications are limited to operational control matters only. Public correspondence (personal messages) to/from crew or passengers can not be accepted.
		129.90 MHz	Extended range VHF. Coverage area includes Canadian Maritime Provinces, and oceanic routes to Bermuda and the Caribbean, from Boston, New York and Washington areas to approximately 250 nautical miles from the east coast.
		130.7 MHz	Extended range VHF. Full period service is provided within most of the Gulf of Mexico. Also on routes between Miami and San Juan to a distance of approximately 250 nautical miles from the Florida coast and within approximately 250 nautical miles of San Juan.
	New York ARINC	436623* 631-244-2492	Aircraft operating within the New York Oceanic FIR.

			*Note: This satellite Voice Air/Ground calling number is available to call ARINC and will be recognized and converted by all Ground Earth Station (GES) service providers to the appropriate Public Service Telephone Network (PTSN) or direct dial number for this communications center.
STATION AND OPERATING AGENCY	**RADIO CALL**	**TRANSMITTING FREQUENCIES**	**REMARKS**
SAN FRANCISCO (ARINC)	San Francisco	3413 3452 5574 6673 8843 10057 13354 kHz	Central East Pacific One Network
		2869 5547 11282 13288 kHz	Central East Pacific Two Network
		2998 4666 6532 8903 11384 13300 17904 21985 kHz	Central West Pacific Network
		3467 5643 8867 13261 17904 kHz	South Pacific Network
		2932 5628 5667 6655 8915 8951 10048 11330 13273 13339 17946 21925 kHz	North Pacific Network
		3013 6640 11342 13348 17925 21964	Long Distance Operations Control (LDOC) Service (phone-patch). Communications are limited to operational control matters only. Public correspondence (personal messages) to/from crew or passengers can not be accepted.
		131.95 MHz	Extended range VHF. Coverage area includes area surrounding the Hawaiian Islands and along the tracks from HNL to

			the mainland. Coverage extends out approximately 250NM from Hawaii and from the West coast.
		129.40 MHz	For en route communications for aircraft operating on Seattle/Anchorage/Routes.
	San Francisco ARINC	436625* 925-371-3920	Aircraft operating within the Oakland and Anchorage Oceanic FIRs.
			*Note: This satellite Voice Air/Ground calling number is available to call ARINC and will be recognized and converted by all Ground Earth Station (GES) service providers to the appropriate Public Service Telephone Network (PTSN) or direct dial number for this communications center.
STATION AND OPERATING AGENCY	**RADIO CALL**	**TRANSMITTING FREQUENCIES**	**REMARKS**
OAKLAND (FAA)	Oakland Radio	122.5 122.2 #121.5 MHz	#Emergency.
STATION AND OPERATING AGENCY	**RADIO CALL**	**TRANSMITTING FREQUENCIES**	**REMARKS**
SAN JUAN P.R. (FAA)	San Juan Radio	#121.5 122.2 126.7 123.65 #243.0 255.4 114.0 113.5 108.2 108.6 109.0 110.6 MHz	Unscheduled broadcasts H+00, H+15, H+30 and H+45 as appropriate, for Weather and Military Activity Advisories, on 110.6, 109.0, 108.6, 108.2, 113.5, and 114.0 MHz. #Emergency. For frequencies 114.0, 113.5, 108.2 and 109.0 MHz use 122.1 MHz for transmissions to San Juan Radio. For frequency 108.6 use 123.6 MHz.

e. All users of the North Atlantic HF MWARA services should consult International NOTAMS a ICAO Regional Supplementary Procedures, Document 7030, for current procedures concerning t operational use of the North Atlantic HF families. At present, procedures for the distribution of communications traffic in the North Atlantic are:

1. All aircraft registered in the hemisphere west of 30W should use family alpha on the southe routes and family bravo on the central and northern routes. (Southern routes are those which enter t New York, San Juan and Santa Maria FIRs. The central and northern routes comprise all others.)

2. All aircraft registered in the hemisphere east of 30W should use family alpha on the southe routes and family charlie on the central and northern routes.

3. All aircraft should use family alpha on the southern route and family delta on the central a northern routes while outside the organized track system (OTS).

4. Aircraft registered in Australia will use families designated to aircraft registered east of 30W.

f. Aircraft operating in the Anchorage Arctic CTA/FIR beyond line of sight range of remote cont VHF air/ground facilities operated from the Anchorage ACC, shall maintain communications w Cambridge Bay radio and a listening or SELCAL watch on HF frequencies of the North Atlantic (NAT D) network (2971 kHz, 4675 kHz, 8891 kHz and 11279 kHz). Additionally, and in view reported marginal reception of the Honolulu Pacific VOLMET broadcasts in that and adjac Canadian airspace, Cambridge Bay radio can provide Anchorage and Fairbanks surface observatic and terminal forecasts to flight crews on request.

1-9-2. Selective Calling System (SELCAL) Facilities Available

The SELCAL is a communication system which permits the selective calling of individual aircraft o radio-telephone channels from the ground station to properly equipped aircraft, so as to eliminate t need for the flight crew to constantly monitor the frequency in use.

Location	Operator	HF	VHF
New York	ARINC	X	X
San Francisco	ARINC	X	X

Questions about this page? Accessibility Privacy Policy

For further information, please contact:

Federal Aviation Administration
Air Traffic Service International Staff
AAT-30C Room 425
800 Independence Avenue SW
Washington DC 20591

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International Flight Information

General Information

Oceanic Long-Range Navigation Information

Basic Oceanic Long-Range Navigation and Communication Requirements

a. Any operation which is conducted in international oceanic airspace on an IFR flight plan, a V controlled flight plan, or at night, and is continued beyond the published range of normal airw navigation facilities (NDB, VOR/DME), is considered to be a long-range Class II navigation operati Long-range Class II navigation in Controlled Airspace (CTA) requires the aircraft to be navigated wi the degree of accuracy required for air traffic control, meaning that the aircraft must follow centerline of the assigned route, maintain the assigned altitude, and the speed filed or assign Accurate navigational performance is required to support the separation minima which air traffic con units apply. These separation minima can be found in the International Civil Aviation Organizat (ICAO) Regional Supplementary Procedures Document 7030 and Air Traffic Control (FAA Or 7110.65).

b. Federal Aviation Regulation 14 CFR Part 91.1(b) requires that civil aircraft must comply with IC Annex 2 when operating over the high seas. Annex 2 requires that *"Aircraft shall be equipped v suitable instruments and with navigation equipment appropriate to the route being flown."* In additi ICAO, Annex 6, Part II stipulates that an airplane operated in international airspace be provided v navigation equipment which will enable it to proceed in accordance with the flight plan and with requirements of air traffic services. This means that the navigation equipment, installed and approv should be capable of providing the pilot with the ability to navigate the aircraft with sufficient accurac

c. Annex 2 further requires that an aircraft shall adhere to the *"current flight plan unless a request a change has been made and clearance obtained from the appropriate air traffic control facility."* Ann 2, also requires that *"unless otherwise authorized or directed by the appropriate air traffic control u controlled flights shall, insofar as practicable: (a) when on an established ATS route, operate along centerline of that route; or (b) when on another route, operate directly between the navigation facili and/or points defining that route."* In the event that a flight inadvertently deviates from the route which it has been cleared, action shall be taken immediately to adjust the heading of the aircraf rejoin the track as soon as possible. Furthermore, when a deviation from track is discovered, air tra control must be informed so that appropriate actions may be taken to resolve any potential hazard other aircraft which may have been created by the deviation. In contrast to operations in the dome radar environment, operations in most oceanic areas are based on *strategic* clearance procedu wherein separation depends on each aircraft navigating accurately. Any navigation error which res in an aircraft straying from the centerline of its cleared route and beyond its protected airspace co create a significant hazard, since the error would not normally be observed by air traffic control.

d. ICAO, Annex 6, Part II contains standards and recommended practices adopted as the minim standards for all airplanes engaged in general aviation international air navigation. It requires t those airplanes operated in accordance with IFR, at night, or on a VFR controlled flight (such as CTA/FIR Oceanic Airspace), have installed and approved radio communication equipment capable conducting two-way communication at any time during the flight with such aeronautical stations and such frequencies as may be prescribed by the appropriate authority.

e. All of the aforementioned requirements contained in Annex 2 (as supplemented by Regic Supplementary Procedures Document 7030 and Annex 6) are incorporated in 14 CFR Section 91.1 those aircraft operating under United States civil certification in international oceanic airspace.

Use of Very High Frequency (VHF) and High Frequency (HF) for Communications

Due to the inherent *line of sight* limitations of VHF radio equipment when used for communication international oceanic airspace, those aircraft operating on an IFR or controlled VFR flight plan beyc the communications capability of VHF *will be required,* as per ICAO, Annex 2, to maintain continuous listening watch and communications capability on the *assigned HF frequencies.* Althou these frequencies will be designated by Air Traffic Control, actual communication will be with gene purpose communication facilities such as international flight service stations or Aeronautical Rac Inc. (ARINC). These facilities will be responsible for the relay of position reports and other pertin information between the aircraft and Air Traffic Control.

Special North Atlantic, Caribbean, and Pacific Area Communications

a. VHF air-to-air frequencies enable aircraft engaged on flights over remote and oceanic areas ou range of VHF ground stations to exchange necessary operational information and to facilitate resolution of operational problems.

b. Frequencies have been designated as follows:

AREA	FREQUENCY
North Atlantic	123.45 MHz
Caribbean	123.45 MHz
Pacific	123.45 MHz

Guard of VHF Emergency Frequence

Pilots should remember that there is a need to continuously guard the VHF emergency frequer 121.5 MHz when on long over-water flights, except when communications on other VHF channe equipment limitations, or cockpit duties prevent simultaneous guarding of two channels. Guarding 121.5 MHz is particularly critical when operating in proximity to flight information region (F boundaries; for example, on Route R220 between Anchorage and Tokyo, since it serves to facilit communications with regard to aircraft which may experience in-flight emergencies, communicatio or navigational difficulties.

REFERENCE-
ICAO Annex 10, Vol. II, Paragraphs 5.2.2.1.1.1 and 5.2.2.1.1.2

Use of Nondirectional Beacon (NDB) for Navigation

a. The use of an NDB as the *primary* source of navigation for long-range oceanic flight presents operator with numerous limitations and restrictions that are inherent in low frequency radio equipm and the low frequency signals they receive. These include:

b. NDB navigation aids of the highest power (2000 or more watts) which are maintained and flig checked as suitable for air navigation, but are limited in their usable service and/or reception range no more than *75 nautical miles* from the facility, *at any altitude.*

c. Although the operator may be able to receive standard amplitude modulation (AM) broadc stations with NDB equipment, primary dependence on these facilities for air navigation is questionable operating practice. The following are some of the inherent problems associated w reception of these stations:

1. Infrequent identification of the station.

2. Identification of foreign language stations may be impossible without some knowledge of t language.

3. Transmitter sites are not always collocated with studio facilities.

4. Termination of service without notice.

5. Weather systems causing erratic and unreliable reception of signal.

6. Atmospheric disturbances causing erratic and unreliable reception of signal.

7. No flight checks conducted to verify the suitability and reliability of the facility and its signal use in air navigation.

8. Fluctuation (bending) of signal due to *shoreline/mountain* effect.

9. Standard broadcast stations are not dedicated for air navigation purposes.

d. Considering the aforementioned limitations, the operator should be able to navigate the aircraft as to maintain the *track/course* and the *tolerances* specified in the Air Traffic Control Clearance (as p ICAO Annex 2 and the Regional Supplementary Procedures Document 7030). Realizing that an er of 10 degrees, at a distance of 2000 miles, equates to approximately 350 miles of course deviati the inadequacies of the *nondirectional beacon* as the sole source of navigation for oceanic flight m be evaluated carefully.

FM Interference

a. The International Civil Aviation organization (ICAO) has established standards which went i effect January 1, 1998, affecting requirements for aircraft ILS/VOR receivers and V communications systems. These standards call for these aircraft navigational and communicatic systems to meet new requirements for immunity from interference from FM broadcast signals. T new requirements address the potential for increased FM interference with these avionics syste beginning in 1998. The details of these standards are outlined in ICAO Annex 10, Volume Paragraphs 3.1.4 and 3.3.8, and Annex 10, Volume III, Paragraph 2.3.3.

b. Due to measures taken by the FAA and the FCC, the enhanced avionics equipage called for the subject standards will not be required or necessary in the United States. Accordingly, the U.S. h notified ICAO of its intention not to implement these standards in U.S. controlled airspace. Howev all operators are reminded of their responsibility to comply with the applicable regulations in force the foreign airspace in which they operate, including any regulations requiring upgraded navigatio and communications equipage compliant with the subject standards.

For further information, please contact:

Federal Aviation Administration
Air Traffic Service International Staff
AAT-30C Room 425
800 Independence Avenue SW
Washington DC 20591

Page Last Updated: April 26, 2002

Sectional Chart Legend

Airports having Control Towers are shown in Blue, all others in Magenta. Consult Airport/Facility Directory (A/FD) for details involving airport lighting, navigation aids, and services. For additional symbol information refer to the Chart User's Guide.

AIRPORTS

Other than hard-surfaced runways

Seaplane Base

Hard-surfaced runways 1500 ft. to 8069 ft. in length

Hard-surfaced runways greater than 8069 ft. or some multiple runways less than 8069 ft.

Open dot within hard-surfaced runway configuration indicates approximate VOR, VOR-DME, or VORTAC location

All recognizable hard-surfaced runways, including those closed, are shown for visual identification. Airports may be public or private.

ADDITIONAL AIRPORT INFORMATION

Private "(Pvt)" – Non-public use having emergency or landmark value.

Military – Other than hard-surfaced. All military airports are identified by abbreviations AFB, NAS, AAF, etc. For complete airport information consult DOD FLIP

Heliport Selected Public

Unverified

Abandoned – paved, having landmark value, 3000 ft. or greater

Ultralight Flight Park Selected

Services–fuel available and field tended during normal working hours depicted by use of ticks around basic airport symbol. (Normal working hours are Mon thru Fri 10:00 A.M. to 4:00 P.M. local time.) Consult A/FD for service availability at airports with hard-surfaced runways greater than 8069 ft.

★ Rotating airport beacon in operation Sunset to Sunrise.

AIRPORT DATA

Box indicates F.A.R. 93 Special Air Traffic Rules & Airport Traffic Patterns

F.A.R. 91

FSS

NO SVFR

NAME (NAM) – Location Identifier

Airport Surveillance Radar

CT – 118.3★ ATIS 123.8

285 L 72 122.95 – UNICOM

VFR Advsy 125.0

Airport of Entry

FSS – Flight Service Station

NO SVFR – Fixed-wing special VFR flight is prohibited.

CT – 118.3 – Control Tower (CT) – primary frequency

NFCT – Non-Federal Control Tower

★ – Star indicates operation part-time (see tower frequencies tabulation for hours of operation).

Ⓒ – Indicates Common Traffic Advisory Frequencies (CTAF)

ATIS 123.8 – Automatic Terminal Information Service

ASOS/AWOS 135.42 – Automated Surface Weather Observing Systems. NDBs broadcasting ASOS/AWOS data may not be located at the airport.

UNICOM – Aeronautical advisory station

VFR Advsy – VFR Advisory Service shown where ATIS not available and frequency is other than primary CT frequency

285 – Elevation in feet

L – Lighting in operation Sunset to Sunrise

*L – Lighting limitations exist, refer to Airport/Facility Directory.

72 – Length of longest runway in hundreds of feet; usable length may be less.

When facility or information is lacking, the respective character is replaced by a dash. All lighting codes refer to runway lights. Lighted runway may not be the longest or lighted full length.

All times are local.

RADIO AIDS TO NAVIGATION AND COMMUNICATION BOXES

VHF OMNI RANGE (VOR)

VORTAC

VOR-DME

Non-Directional Radiobeacon (NDB)

NDB–DME

Other facilities, i.e., Commercial Broadcast Stations, FSS Outlets-RCO, etc.

122.1R 122.6 123.6

OAKDALE

382 ★116.8 OAK

Underline indicates no voice on this freq

★ – Operates less than continuous or On-Request.

Ⓣ – TWEB ■ – HIWAS

R – Receive only

122.1R

CHICAGO CHI

Heavy line box indicates Flight Service Station (FSS). Freqs. 121.5, 122.2, 243.0, and 255.4 (Canada – 121.5, 126.7 and 243.0) are normally available at all FSSs and are not shown above boxes. All other freqs. are shown.

For Local Airport Advisory use FSS freq. 123.6.

122.1R

MIAMI

Controlling FSS

Frequencies above thin line box are remoted to NAVAID site. Other freqs. at controlling FSS may be available as determined by altitude and terrain. Consult Airport/Facility Directory for complete information.

AIRPORT TRAFFIC SERVICE AND AIRSPACE INFORMATION

Only the controlled and reserved airspace effective below 18,000 ft MSL are shown on this chart. All times are local.

Class B Airspace

Class C Airspace (Mode C See F.A.R. 91.215/AIM.)

Class D Airspace

[40] Ceiling of Class D Airspace in hundreds of feet. (A minus ceiling value indicates surface up to but not including that value.)

Class E Airspace

Class E Airspace with floor 700 ft. above surface

Class E Airspace with floor 1200 ft. or greater above surface that abuts Class G Airspace.

2400 MSL / 4500 MSL – Differentiates floors of Class E Airspace greater than 700 ft. above surface

Class E Airspace low altitude Federal Airways are indicated by center line.

Intersection – Arrows are directed towards facilities which establish intersection.

132° V 69

Total mileage between NAVAID's on direct Airways. [169]

Prohibited, Restricted, Warning and Alert Areas Canadian Advisory and Restricted Areas

MOA – Military Operations Area

Special Airport Traffic Areas (See F.A.R. Part 93 for details.)

MODE C (See F.A.R. 91.215/AIM.)

National Security Area

Terminal Radar Service Area (TRSA)

IR21 – MTR – Military Training Routes

OBSTRUCTIONS

1000 ft. and higher AGL

below 1000 ft. AGL

Group Obstruction

Obstruction with high-intensity lights May operate part-time

2049 – Elevation of the top above mean sea level

(1149) – Height above ground

UC – Under construction or reported; position and elevation unverified

NOTICE: Guy wires may extend outward from structures.

MISCELLANEOUS

—1° E— Isogonic Line (1995 VALUE)

Ultralight Activity

Fl ★ Flashing Light

Hang Glider Activity

Marine Light

Glider Operations

NAME (Magenta, Blue, or Black) Visual Check Point

Parachute Jumping Area (See Airport/Facility Directory.)

TOPOGRAPHIC INFORMATION

Roads

95 80 Road Markers

Railroad

Bridges And Viaducts

Power Transmission Lines

Aerial Cable

Landmark Feature – stadium, factory, school, golf course, etc.

Outdoor Theatre

Lookout Tower P-17 (Site Number) 618 (Elevation Base of Tower)

CG Coast Guard Station

Race Track

Tank–water, oil or gas

Oil Well ● Water Well

Mines And Quarries

Mountain Pass 11823 (Elevation of Pass)

Rocks

Pier

Dams

Perennial Lake

Non-Perennial Lake

GLOSSARY OF ACRONYMSGLOSSARY OF ACRONYMS
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

-A-
A/C -Aircraft
A/G -Air to Ground
A/H -Altitude/Height
AAC -Mike Monroney Aeronautical Center
AAF -Army Air Field
AAI -Arrival Aircraft Interval
AAP -Advanced Automation Program
AAR -Airport Acceptance Rate
ABDIS -Automated Data Interchange System Service B
ACAIS -Air Carrier Activity Information System
ACAS -Aircraft Collision Avoidance System
ACC -Area Control Center
ACCT -Accounting Records
ACD -Automatic Call Distributor
ACDO -Air Carrier District Office
ACF -Area Control Facility
ACFO -Aircraft Certification Field Office
ACFT -Aircraft
ACID -Aircraft Identification
ACLS -Automatic Carrier Landing System
ACLT -Actual Landing Time Calculated
ACO -Aircraft Certification Office
ADA -Air Defense Area
ADAP -Airport Development Aid Program
ADAS -AWOS Data Acquisition System
ADCCP -Advanced Data Communications Control Procedure
ADDA -Administrative Data
ADF -Automatic Direction Finding
ADI -Automatic De-Ice and Inhibitor
ADIN -AUTODIN Service
ADIZ -Air Defense Identification Zone
ADL -Aeronautical Data-Link
ADLY -Arrival Delay
ADO -Airline Dispatch Office
ADP -Automated Data Processing
ADS -Automatic Dependent Surveillance
ADSIM -Airfield Delay Simulation Model
ADSY -Administrative Equipment Systems
ADTN -Administrative Data Transmission Network
ADTN2000 -Administrative Data Transmission Network 2000
ADVO -Administrative Voice
AEG -Aircraft Evaluation Group
AERA -Automated En-Route Air Traffic Control

AEX -Automated Execution
AF -Airway Facilities
AFB -Air Force Base
AFIS -Automated Flight Inspection System
AFP -Area Flight Plan
AFRES -Air Force Reserve Station
AFS -Airways Facilities Sector
AFSFO -AFS Field Office
AFSFU -AFS Field Unit
AFSOU -AFS Field Office Unit (Standard is AFSFOU)
AFSS -Automated Flight Service Station
AFTN -Automated Fixed Telecommunications Network
AGL -Above Ground Level
AID -Airport Information Desk
AIG -Airbus Industries Group
AIM -Airman's Information Manual
AIP -Airport Improvement Plan
AIRMET -Airmen's Meteorological Information
AIRNET -Airport Network Simulation Model
AIS -Aeronautical Information Service
AIT -Automated Informtion Transfer
ALP -Airport Layout PLan
ALS -Approach Lighting System
ALSF1 -ALS with Sequenced Flashers I
ALSF2 -ALS with Sequenced Flashers II
ALSIP -Approach Lighting System Improvement Plan
ALTRV -Altitude Reservation
AMASS -Airport Movement Area Safety System
AMCC -ACF/ARTCC Maintenance Control Center
AMOS -Automated Meteorological Observation Station
AMP -ARINC Message Processor (OR) Airport Master Plan
AMVER -Automated Mutual Assistance Vessel Rescue System
ANC -Alternate Network Connectivity
ANG -Air National Guard
ANGB -Air National Guard Base
ANMS -Automated Network Monitoring System
ANSI -American National Standards Group
AP -Acquisition Plan
APP -Approach
APS -Airport Planning Standard
AQAFO -Aeronautical Quality Assurance Field Office
ARAC -Army Radar Approach Control (AAF)
ARAC -Aviation Rulemaking Advisory Committee
ARCTR -FAA Aeronautical Center or Academy
ARF -Airport Reservation Function
ARINC -Aeronautical Radio, Inc.
ARLNO -Airline Office
ARO -Airport Reservation Office
ARP -Airport Reference Point

ARSA -Airport Service Radar Area
ARSR -Air Route Surveillance Radar
ARTCC -Air Route Traffic Control Center
ARTS -Automated Radar Terminal System
ASAS -Aviation Safety Analysis System
ASC -AUTODIN Switching Center
ASCP -Aviation System Capacity Plan
ASD -Aircraft Situation Display
ASDA -Accelerate - Stop Distance Available
ASLAR -Aircraft Surge Launch And Recovery
ASM -Available Seat Mile
ASP -Arrival Sequencing Program
ASOS -Automatic Surface Observation System
ASQP -Airline Service Quality Performance
ASR -Airport Surveillance Radar
ASTA -Airport Surface Traffic Automation
ASV -Airline Schedule Vendor
AT -Air Traffic
ATA -Air Transport Association of America
ATAS -Airspace and Traffic Advisory Service
ATCAA -Air Traffic Control Assigned Airspace
AT&T -American Telephone and Telegraph
AT&T ASDC -AT&T Agency Service Delivery Center
AT&T CSA -AT&T Customer Support Associate
ATC -Air Traffic Control
ATCBI -Air Traffic Control Beacon Indicator
ATCCC -Air Traffic Control Command Center
ATCO -Air Taxi Commercial Operator
ATCRB -Air Traffic Control Radar Beacon
ATCRBS -Air Traffic Control Radar Beacon System
ATCSCC -Air Traffic Control Systems Command Center
ATCT -Airport Traffic Control Tower
ATIS -Automated Terminal Information Service
ATISR -ATIS Recorder
ATM -Air Traffic Management
ATM -Asynchronous Transfer Mode
ATMS -Advanced Traffic Management System
ATN -Aeronautical Telecommunications Network
ATODN -AUTODIN Terminal (FUS)
ATOVN -AUOTVON (Facility)
ATOMS -Air Traffic Operations Management System
ATS -Air Traffic Service
ATSCCP -ATS Contingency Command Post
ATTIS -AT&T Information Systems
AUTODIN -DoD Automatic Digital Network
AUTOVON -DoD Automatic Voice Network
AVON -AUTOVON Service
AVN -Aviation Standards National Field Office, Oklahoma City
AWIS -Airport Weather Information

AWOS -Automated Weather Observation System
AWP -Aviation Weather Processor
AWPG -Aviation Weather Products Generator
AWS -Air Weather Station
-B-
BANS -BRITE Alphanumeric System
BART -Billing Analysis Reporting Tool (GSA software tool)
BASIC -Basic Contract Observing Station
BASOP -Military Base Operations
BCA -Benefit/Cost Analysis
BCR -Benefit/Cost Ratio
BDAT -Digitized Beacon Data
BMP -Best Management Practices
BOC -Bell Operating Company
bps -bits per second
BRI -Basic Rate Interface
BRITE -Bright Radar Indicator Terminal Equipment
BRL -Building Restriction Line
BUEC -Back-up Emergency Communications
BUECE -Back-up Emergency Communications Equipment
-C-
CAA -Civil Aviation Authority
CAB -Civil Aeronautics Board
CARF -Central Altitude Reservation Facility
CASFO -Civil Aviation Security Office
CAT -Category
CAT -Clear - Air Turbulence
CAU -Crypto Ancillary Unit
CBI -Computer Based Instruction
CCC -Communications Command Center
CCCC -Staff Communications
CCCH -Central Computer Complex Host
CC&O -Customer Cost and Obligation
CCSD -Command Communications Service Designator
CCS7-NI -Communication Channel Signal-7 - Network Interconnect
CCU -Central Control Unit
CD -Common Digitizer
CDR -Cost Detail Report
CDT -Controlled Departure Time
CDTI -Cockpit Display of Traffic Information
CENTX -Central Telephone Exchange
CEQ -Council on Environmental Quality
CERAP -Central Radar Approach
CFC -Central Flow Control
CFCF -Central Flow Control Facility
CFCS -Central Flow Control Service
CFWP -Central Flow Weather Processor
CFWU -Central Flow Weather Unit
CGAS -Coast Guard Air Station

CLC -Course Line Computer
CLIN -Contract Line Item
CLT -Calculated Landing Time
CM -Commercial Service Airport
CNMPS -Canadian Minimum Navigation Performance Specification Airspace
CNS -Consolidated NOTAM System
CNSP -Consolidated NOTAM System Processor
CO -Central Office
COE -U.S. Army Corps of Engineers
COMCO -Command Communications Outlet
CONUS -Continental United States
CORP -Private Corporation other than ARINC or MITRE
CPE -Customer Premise Equipment
CPMIS -Consolidated Personnel Management Information System
CRA -Conflict Resolution Advisory
CRDA -Converging Runway Display Aid
CRT -Cathode Ray Tube
CSA -Communications Service Authorization
CSIS -Centralized Storm Information System
CSO -Customer Service Office
CSR -Communications Service Request
CSS -Central Site System
CTA -Controlled Time of Arrival
CTA -Control Area
CTA/FIR -Control Area/Flight Information Region
CTAF -Common Traffic Advisory Frequency
CTAS -Center - Tracon Automation System
CTMA -Center Traffic Management Advisor
CUPS -Consolidated Uniform Payroll System
CVFR -Controlled Visual Flight Rules
CVTS -Compressed Video Transmission Service
CW -Continuous Wave
CWSU -Central Weather Service Unit
CWY -Clearway
-D-
DA -Direct Access
DA -Decision Altitude/Decision Height
DA -Descent Advisor
DABBS -DITCO Automated Bulletin Board System
DAIR -Direct Altitude and Identity Readout
DAR -Designated Agency Representative
DARC -Direct Access Radar Channel
dBA -Decibels A-weighted
DBCRC -Defense Base Closure and Realignment Commission
DBMS -Data Base Management System
DBRITE -Digital Bright Radar Indicator Tower Equipment
DCA -Defense Communications Agency
DCAA -Dual Call, Automatic Answer Device
DCCU -Data Communications Control Unit

DCE -Data Communications Equipment
DDA -Dedicated Digital Access
DDD -Direct Distance Dialing
DDM -Difference in Depth of Modulation
DDS -Digital Data Service
DEA -Drug Enforcement Agency
DEDS -Data Entry and Display System
DEIS -Draft Environmental Impact Statement
DEP -Departure
DEWIZ -Distance Early Warning Identification Zone
DF -Direction Finder
DFAX -Digital Facsimile
DFI -Direction Finding Indicator
DGPS -Differential Global Positioning Satellite (System)
DH -Decision Height
DID -Direct Inward Dial
DIP -Drop and Insert Point
DIRF -Direction Finding
DITCO -Defense Information Technology Contracting Office Agency
DME -Distance Measuring Equipment
DME/P -Precision Distance Measuring Equipment
DMN -Data Multiplexing Network
DNL -Day-Night Equivalent Sound Level (Also called Ldn)
DOD -Direct Outward Dial
DoD -Department of Defense
DOI -Department of Interior
DOS -Department of State
DOT -Department of Transportation
DOTS -Dynamic Ocean Tracking System
DOTCC -Department of Transportation Computer Center
DSCS -Digital Satellite Compression Service
DSUA -Dynamic Special Use Airspace
DTS -Dedicated Transmission Service
DUAT -Direct User Access Terminal
DVFR -Defense Visual Flight Rules
DVFR -Day Visual Flight Rules
DVOR -Doppler Very High Frequency Omni-Directional Range
DYSIM -Dynamic Simulator

-E-
E-MSAW -En-Route Automated Minimum Safe Altitude Warning
EARTS -En Route Automated Radar Tracking System
ECOM -En Route Communications
ECVFP -Expanded Charted Visual Flight Procedures
EDCT -Expedite Departure Path
EFAS -En Route Flight Advisory Service
EFC -Expect Further Clearance
EFIS -Electronic Flight Information Systems
EIAF -Expanded Inward Access Features

EIS - Environmental Impact Statement
ELT -Emergency Locator Transmitter
ELWRT -Electrowriter
EMPS -En Route Maintenance Processor System
ENAV -En Route Navigational Aids
EPA -Enviromental Protection Agency
EPS -Engineered Performance Standards
EOF -Emergency Operating Facility
EPSS -Enhanced Packet Switched Service
ERAD -En Route Broadband Radar
ESEC -En Route Broadband Secondary Radar
ESP -En Route Spacing Program
ESYS -En Route Euipment Systems
ESF -Extended Superframe Format
ETA -Estimated Time of Arrival
ETE -Estimated Time En Route
ETG -Enhanced Target Generator
ETMS -Enhanced Traffic Management System
ETN -Electronic Telecommunications Network
EVAS -Enhanced Vortex Advisory System
EVCS -Emergency Voice Communications System

-F-
FAA -Federal Aviation Administration
F&E -Facility and Equipment
FAAAC -FAA Aeronautical Center
FAACIS -FAA Communications Information System
FAATC -FAA Technical Center
FAC -Facility
FAF -Final Approach Fix
FAP -Final Approach Point
FAPM -FTS2000 Associate Program Manager
FAR -Federal Aiviation Regulation
FAATSAT -FAA Telecommunications Satellite
FAST -Final Approach Spacing Tool
FAX -Facsimile Equipment
FBO -Fixed Base Operator
FBS -Fall Back Switch
FCC -Federal Communications Commission
FCLT -Freeze Calculated Landing Time
FCOM -FSS Radio Voice Communications
FCPU -Facility Central Processing Unit
FDAT -Flight Data Entry and Printout (FDEP) and Flight Data Service
FDE -Flight Data Entry
FDEP -Flight Data Entry and Printout
FDIO -Flight Data Input/Output
FDIOC -Flight Data Input/Output Center
FDIOR -Flight Data Input/Output Remote
FDM -Frequency Division Multiplexing

FDP -Flight Data Processing
FED -Federal
FEIS -Final Environmental Impact Statement
FEP -Front End Processor
FFAC -From Facility
FIFO -Flight Inspection Field Office
FIG -Flight Inspection Group
FINO -Flight Inspection National Field Office
FIPS -Federal Information Publication Standard
FIR -Flight Information Region
FIRE -Fire Station
FIRMR -Federal Information Resource Management Regulation
FL -Flight Level
FLOWSIM -Traffic Flow Planning Simulation
FMA -Final Monitor Aid
FMF -Facility Master File
FMIS -FTS2000 Management Information System
FMS -Flight management System
FNMS -FTS2000 Network Management System
FOIA -Freedom Of Information Act
FP -Flight Plan
FRC -Request Full Route Clearance
FSAS -Flight Service Automation System
FSDO -Flight Standards District Office
FSDPS -Flight Service Data Processing System
FSEP -Facility/Service/Equipment Profile
FSP -Flight Strip Printer
FSPD -Freeze Speed Parameter
FSS -Flight Service Station
FSSA -Flight Service Station Automated Service
FSTS -Federal Secure Telephone Service
FSYS -Flight Service Station Equipment Systems
FTS -Federal Telecommunications System
FTS2000 -Federal Telecommunications System 2000
FUS -Functional Units or Systems
FWCS -Flight Watch Control Station

-G-
GA -General Aviation
GAA -General Aviation Activity
GAAA -General Aviation Activity and Avionics
GADO -General Aviation District Office
GCA -Ground Control Approach
GNAS -General National Airspace System
GNSS -Global Navigation Satellite System
GOES -Geostationary Operational Environmental Satellite
GOESF -GOES Feed Point
GOEST -GOES Terminal Equipment
GPS -Global Positioning Satellite

GPWS -Ground Proximity Warning System
GRADE -Graphical Airspace Design Environment
GS -Glide Slope Indicator
GSA -General Services Administration

-H-
H -Non-Directional Radio Homing Beacon (NDB)
HAA -Height Above Airport
HAL -Height Above Landing
HARS -High Altitude Route System
HAT -Height Above Touchdown
HAZMAT -Hazardous Materials
HCAP -High Capacity Carriers
HLDC -High Level Data Link Control
HDME -NDB with Distance Measuring Equipment
HDQ -FAA Headquarters
HELI -Heliport
HF -High Frequency
HH -NDB, 2kw or More
HI-EFAS -High Altitude EFAS
HOV -High Occupancy Vehicle
HSI -Horizontal Siruation Indicators
HUD -Housing and Urban Development
HWAS -Hazardous In-Flight Weather Advisory
Hz -HERTZ

-I-
IA -Indirect Access
IAF -Initial Approach Fix
I/AFSS -International AFSS
IAP -Instrument Approach Procedures
IAPA -Instrument Approach Procedures Automation
IBM -International Business Machines
IBP -International Boundary Point
IBR -Intermediate Bit Rate
ICAO -International Civil Aviation Organization
ICSS -International Communications Switching Systems
IDAT -Interfacility Data
IF -Intermediate Fix
IFCP -Interfacility Communications Processor
IFDS -Interfacility Data System
IFEA -In-Flight Emergency Assistance
IFO -International Field Office
IFR -Instrument Flight Rules
IFSS -International Flight Service Station
ILS -Instrument Landing System
IM -Inner Marker
IMC -Instrument Meteorological Conditions
INM -Integrated Noise Model

INS -Inertial Navigation System
IRMP -Information Resources Management Plan
ISDN -Integrated Services Digital Network
ISMLS -Interim Standard Microwave Landing System
ITI -Interactive Terminal Interface
IVRS -Interim Voice Response System
IW -Inside Wiring

-J-
-K-
Kbps -Kilobits Per Second
Khz -Kilohertz
KVDT -Keyboard Video Display Terminal

-L-
LAA -Local Airport Advisory
LAAS -Low Altitude Alert System
LABS -Leased A B Service
LABSC -LABS GS-200 Computer
LABSR -LABS Remote Equipment
LABSW -LABS Switch Sysem
LAHSO -Land and Hold Short Operation
LAN -Local Area Network
LATA -Local Access and Transport Area
LAWRS -Limited Aviation Weather Reporting System
LCF -Local Control Facility
LCN -Local Communications Network
LDA -Localizer Directional Aid
LDA -Landing Directional Aid
LDIN -Lead-in Lights
LEC -Local Exchange Carrier
LF -Low Frequency
LINCS -Leased Interfacility NAS Communications System
LIS -Logistics and Inventory System
LLWAS -Low Level Wind Shear Alert System
LM/MS -Low/Medium Frequency
LMM -Locator Middle Marker
LMS -LORAN Monitor Site
LOC -Localizer
LOCID -Location Identifier
LOI -Letter of Intent
LOM -Compass Locator at Outer Marker
LORAN -Long Range Aid to Navigation
LRCO -Limited Remote Communications Outlet
LRNAV -Long Range Navigation
LRR -Long Range Radar

-M-
MAA -Maximum Authorized Altitude

MALS -Medium Intensity Approach Lighting System
MALSF -MALS with Sequenced Flashers
MALSR -MALS with Runway Alignment Indicator Lights
MAP -Modified Access Pricing
MAP -Military Airport Program
MAP -Missed Approach Point
MAP -Maintenance Automation Program
Mbps -Megabits Per Second
MCA -Minimum Crossing Altitude
MCAS -Marine Corps Air Station
MCC -Maintenance Control Center
MCL -Middle Compass Locater
MCS -Maintenance and Control System
MDA -Minimum Descent Altitude
MDT -Maintenance Data Terminal
MEA -Minimum En Route Altitude
METI -Meteorological Information
MF -Middle Frequency
MFJ -Modified Final Judgement
MFT -Meter Fix Crossing Time/Slot Time
MHA -Minimum Holding Altitude
Mhg -MegHERTZ
MIA -Minimum IFR Altitudes
MIDO -Manufacturing Inspection District Office
MIS -Meteorological Impact Statement
MISC -Miscellaneous
MISO -Manufacturing Inspection Satellite Office
MIT -Miles In Trail
MITRE -Mitre Corporation
MLS -Microwave Landing System
MM -Middle Marker
MMC -Maintenance Monitoring Console
MMS -Maintenance Monitoring System
MNPS -Minimum Navigation Performance Specification
MNPSA -Minimum Navigation Performance Specifications Airspace
MOA -Memoramdum of Agreement
MOA -Military Operations Area
MOCA -Minimum Obstruction Clearance Altitude
MODE C -Altitude-Encoded Beacon Reply
MODE C -Altitude Reporting Mode of Secondary Radar
MODE S -Mode Select Beacon System
MOU -Memorandum of Understanding
MPO -Metropolitan Planning Organization
MPS -Maintenance Processor Subsystem (OR) Master Plan Supplement
MRA -Minimum Reception Altitude
MRC -Monthly Recurring Charge
MSA -Minimum Safe Altitude
MSAW -Minimum Safe Altitude Warning
MSL -Mean Sea Level

MSN -Message Switching Network
MTCS -Modular Terminal Communications System
MTI -Moving Target Indicator
MUX -Multiplexor
MVA -Minimum Vectoring Altitude
MVFR -Marginal Visual Flight Rules

-N-
NAAQS -National Ambient Air Quality Standards
NADA -NADIN Concentrator
NADIN -National Airspace Data Interchange Network
NADSW -NADIN Switches
NAILS -National Airspace Integrated Logistics Support
NAMS -NADIN IA
NAPRS -National Airspace Performance Reporting System
NAS -National Airspace System or Naval Air Station
NASDC -National Aviation Safety Data
NASP -National Airspace System Plan
NASPAC -National Airspace System Performance Analysis Capability
NATCO -National Communications Switching Center
NAVAID -Navigation Aid
NAVMN -Navigation Monitor and Control
NAWAU -National Aviation Weather Advisory Unit
NAWPF -National Aviation Weather Processing Facility
NCAR -National Center for Atmospheric Research; Boulder, CO
NCF -National Control Facility
NCIU -NEXRAD Communications Interface Unit
NCS -National Communications System
NDB -Non-Directional Radio Homing Beacon
NDNB -NADIN II
NEPA -National Environmental Policy Act
NEXRAD -Next Generation Weather Radar
NFAX -National Facsimile Service
NFDC -National Flight Data Center
NFIS -NAS Facilities Information System
NI -Network Interface
NICS -National Interfacility Communications System
NPIAS -National Plan of Integrated Airport Systems
NM -Nautical Mile
NMAC -Near Mid Air Collision
NMC -National Meteorological Center
NMCE -Network Monitoring and Control Equipment
NMCS -Network Monitoring and Control System
NOAA -National Oceanic and Atmospheric Administration
NOC -Notice Of Completion
NOTAM -Notice to Airmen
NPDES -National Pollutant Discharge Elimination System
NPIAS -National Plan of Integrated Airport Systems
NRC -Non-Recurring Charge

NRCS -National Radio Communications Systems
NSAP -National Service Assurance Plan
NSSFC -National Severe Storms Forecast Center
NSSL -National Severe Storms Laboratory; Norman, OK
NTAP -Notices To Airmen Publication
NTP -National Transportation Policy
NTSB -National Transportation Safety Board
NTZ -No Transgression Zone
NWS -National Weather Service
NWSR -NWS Weather Excluding NXRD
NSWRH -NWS Regional Headquarters
NXRD -Advanced Weather Radar System

-O-
OAG -Official Airline Guide
OALT -Operational Acceptable Level of Traffic
OAW -Off-airway Weather Station
ODAL -Omnidirectional Approach Lighting System
ODAPS -Oceanic Display and Processing Station
OFA -Object Free Area
OFDPS -Offshore Flight Data Processing System
OFT -Outer Fix Time
OFZ -Obstacle Free Zone
OM -Outer Marker
OMB -Office of Management and Budget
ONER -Oceanic Navigational Error Report
OPLT -Operational Acceptable Level of Traffic
OPSW -Operational Switch
OPX -Off Premises Exchange
ORD -Operational Readiness Demonstration
OTR -Oceanic Transition Route
OTS -Organized Track System
-P-
PABX -Private Automated Branch Exchange
PAD -Packet Assembler/Disassembler
PAM -Peripheral Adapter Module
PAPI -Precision Approach Path Indicator
PAR -Percision Approach Radar
PAR -Preferential Arrival Route
PATWAS -Pilots Automatic Telephone Weather Answering Service
PBCT -Proposed Boundary Crossing Time
PBRF -Pilot Briefing
PBX -Private Branch Exchange
PCA -Positive Control Airspace
PCM -Pulse Code Modulation
PDAR -Preferential Arrival And Departure Route
PDC -Pre-Departure Clearance
PDC -Program Designator Code
PDR -Preferential Departure Route

PDN -Public Data Network
PFC -Passenger Facility Charge
PHONE -Telephone
PIC -Principal Interexchange Carrier
PIDP -Programmable Indicator Data Processer
PIREP -Pilot Weather Report
PMS -Program Management System
POLIC -Police Station
POP -Point Of Presence
POT -Point Of Termination
PPIMS -Personal Property Information Management System
PR -Primary Commercial Service Airport
PRI -Primary Rate Interface
PRM -Precision Runway Monitor
PSDN -Public Switched Data Network
PSN -Packet Switched Network
PSS -Packet Switched Service
PSTN -Public Switched Telephone Network
PUB -Publication
PUP -Principal User Processor
PVC -Permanent Virtual Circuit
PVD -Plan View Display

-Q-
-R-
RAIL -Runway Alignment Indicator Lights
RAPCO -Radar Approach Control (USAF)
RAPCON -Radar Approach Control (FAA)
RATCC -Radar Air Traffic Control Center
RATCF -Radar Air Traffic Control Facility (USN)
RBC -Rotating Beam Ceilometer
RBDPE -Radar Beacon Data Processing Equipment
RBSS -Radar Bomb Scoring Squadron
RCAG -Remote Communications Air/Ground
RCC -Rescue Coordination Center
RCF -Remote Communication Facility
RCCC -Regional Communications Control Centers
RCIU -Remote Control Interface Unit
RCL -Radio Communications Link
RCLR -RCL Repeater
RCLT -RCL Terminal
RCO -Remote Communications Outlet
RCU -Remote Control Unit
RDAT -Digitized Radar Data
RDP -Radar Data Processing
RDSIM -Runway Delay Simulation Model
REIL -Runway End Identification Lights
RF -Radio Frequency
RL -General Aviation Reliever Airport

RMCC -Remote Monitor Control Center
RMCF -Remote Monitor Control Facility
RML -Radio Microwave Link
RMLR -RML Repeater
RMLT -RML Terminal
RMM -Remote Maintenance Monitoring
RMMS -Remote Maintenance Monitoring System
RMS -Remote Monitoring Subsystem
RMSC -Remote Monitoring Subsystem Concentrator
RNAV -Area Navigation
RNP -Required Navigation Performance
ROD -Record of Decision
ROSA -Report of Service Activity
ROT -Runway Occupancy Time
RP -Restoration Priority
RPC -Restoration Priority Code
RPG -Radar Processing Group
RPZ -Runway Protection Zone
RRH -Remote Reading Hygrothermometer
RRHS -Remote Reading Hydrometer
RRWDS -Remote Radar Weather Display
RRWSS -RWDS Sensor Site
RSS -Remote Speaking System
RT -Remote Transmitter
RT & BTL -Radar Tracking And Beacon Tracking Level
RTAD -Remote Tower Alphanumerics Display
RTCA -Radio Technical Commission for Aeronautics
RTR -Remote Transmitter/Receiver
RTRD -Remote Tower Radar Display
RVR -Runway Visual Range
RW -Runway
RWDS -Same as RRWDS
RWP -Realtime Weather Processor

-S-
S/S - Sector Suite
SAC -Strategic Air Command
SAFI -Semi Automatic Flight Inspection
SALS -Short Approach Lighting System
SATCOM -Satellite Communications
SAWRS -Supplementary Aviation Weather Reporting System
SCC -System Command Center
SCVTS -Switched Compressed Video Telecommunications Service
SDF -Simplified Direction Finding
SDF -Software Defined Network
SDIS -Switched Digital Integrated Service
SDP -Service Delivery Point
SDS -Switched Data Service
SEL -Single Event Level

SELF -Simplified Short Approach Lighting System With Sequenced Flashing Lights
SFAR-38 -Special Federal Aviation Regulation 38
SHPO -State Historic Preservation Officer
SIC -Service Initiation Charge
SID -Station Identifier
SID -Standard Instrument Departure
SIGMET -Significant Meteorological Information
SIMMOD -Airport and Airspace Simulation Model
SIP -State Implementation Plan
SM -Statute Miles
SMGC -Surface Movement Guidance and Control
SMPS -Sector Maintenance Processor Subsystem
SMS -Simulation Modeling System
SNR -Signal-to-Noise Ratio, also: S/N
SOC -Service Oversight Center
SOIR -Simultaneous Operations On Intersecting Runways
SOIWR -Simultaneous Operations on Intersecting Wet Runways
SRAP -Sensor Receiver and Processor
SSALF -SSALS with Sequenced Flashers
SSALR -Simplified Short Approach Lighting System
SSB -Single Side Band
STAR -Standard Terminal Arrival Route
STD -Standard
STMUX -Statistical Data Multiplexer
STOL -Short Takeoff and Landing
SURPIC -Surface Picture
SVCA -Service A
SVCB -Service B
SVCC -Service C
SVCO -Service O
SVFO -Interphone Service F (A)
SVFB -Interphone Service F (B)
SVFC -Interphone Service F (C)
SVFD -Interphone Service F (D)
SVFR -Special Visual Flight Rules

-T-
T1MUX -T1 Multiplexer
TAAS -Terminal Advance Automation System
TACAN -Tactical Aircraft Control and Navigation
TACR -TACAN at VOR, TACAN only
TAF -Terminal Area Forecast
TARS -Terminal Automated Radar Service
TAS -True Air Speed
TATCA -Terminal Air Traffic Control Automation
TAVT -Terminal Airspace Visualization Tool
TCA -Traffic Control Airport or Tower Control Airport
TCA -Terminal Control Area
TCACCIS -Transportation Coordinator Automated Command and Control Information

System
TCAS -Traffic Alert And Collision Avoidance System
TCC -DOT Transportation Computer Center
TCCC -Tower Control Computer Complex
TCE -Tone Control Equipment
TCLT -Tentative Calculated Landing Time
TCO -Telecommunications Certification Officer
TCOM -Terminal Communications
TCS -Tower Communications System
TDLS -Tower Data-Link Services
TDMUX -Time Division Data Multiplexer
TDWR -Terminal Doppler Weather Radar
TELCO -Telephone Company
TELMS -Telecommunications Management System
TERPS -Terminal Instrument Procedures
TFAC -To Facility
TH -Threshold
TIMS -Telecommunications Information Management System
TIPS -Terminal Information Processing System
TL -Taxilane
TMA -Traffic Management Advisor
TMC -Traffic Management Coordinator
TMC/MC -Traffic Management Coordinator/Military Coordinator
TMCC -Terminal Information Processing System
TMCC -Traffic Management Computer Complex
TMF -Traffic Management Facility
TML -Television Microwave Link
TMLI -Television Microwave Link Indicator
TMLR -Television Microwave Link Repeater
TMLT -Television Mircowave Link Terminal
TM&O -Telecommunications Management and Operations
TMP -Traffic Management Processor
TMS -Traffic Management System
TMSPS -Traffic Management Specialists
TMU -Traffic Management Unit
TODA -Takeoff Distance Available
TOF -Time Of Flight
TOFMS -Time of Flight Mass Spectrometer
TOPS -Telecommunications Ordering and Pricing System (GSA software tool)
TORA -Take-off Run Available
TNAV -Terminal Navigational Aids
TR -Telecommunications Request
TRACAB -Terminal Radar Approach Control in Tower Cab
TRACON -Terminal Radar Approach Control Facility
TRAD -Terminal Radar Service
TRNG -Training
TSA -Taxiway Safety Area
TSEC -Terminal Secondary Radar Service
TSP -Telecommunications Service Priority

TSR -Telecommunications Service Request
TSYS -Terminal Equipment Systems
TTMA -TRACON Traffic Management Advisor
TTY -Teletype
TVOR -Terminal VHF Omnidirectional Range
TW -Taxiway
TWEB -Transcribed WeatherBroadcastTWR-Tower (non-controlled)
TY -Type (FAACIS)

-U-
UAS -Uniform Accounting System
UHF -Ultra High Frequency
URA -Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
USAF -United States Air Force
USOC -Uniform Service Order Code
-V-
VASI -Visual Approach Slope Indicator
VDME -VOR with Distance Measuring Equipment
VF -Voice Frequency
VFR -Visual Flight Rules
VHF -Very High Frequency
VLF -Very Low Frequency
VMC -Visual Meteorological Conditions
VNAV -Visual Navigational Aids
VNTSC -Volpe National Transportation System Center
VON -Virtual On-net
VOR -VHF Omnidirectional Range
VOR/DME -VHF Omnidirectional Range/Distance Measuring Equipment
VORTAC -VOR collocated with TACAN
VOT -VOR Test Facility
VRS -Voice Recording System
VSCS -Voice Switching and Control System
VTA -Vertex Time of Arrival
VTAC -VOR collocated with TACAN
VTOL -Vertical Takeoff and Landing
VTS -Voice Telecommunications System
-W-
WAAS -Wide Area Augmentation System
WAN -Wide Area Network
WC -Work Center
WCP -Weather Communications Processor
WECO -Western Electric Company
WESCOM -Western Electric Satellite Communications
WMSC -Weather Message Switching Center
WMSCR -Weather Message Switching Center Replacement
WSCMO -Weather Service Contract Meteorological Observatory
WSFO -Weather Service Forecast Office
WSMO -Weather Service Meteorological Observatory

WSO -Weather Service Office
WTHR -"Weather"
WX -Weather
-X-
-Y-
-Z-

KARR Aurora Municipal Airport
Chicago/Aurora, Illinois, USA

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

Lat/Long: 41-46-18.946N / 088-28-32.373W
41-46.31577N / 088-28.53955W
41.7719294 / -88.4756592
(estimated)
Elevation: 712 ft. / 217.0 m (surveyed)
Variation: 01W (1990)
From city: 38 miles W of central business district of the associated city

Airport Operations

Facility use: Open to the public
Sectional chart: CHICAGO
Control tower: yes
ARTCC: CHICAGO CENTER
FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
NOTAMs facility: ARR (NOTAM-D service available)
Attendance: 0600-0000
Wind indicator: lighted
Segmented circle: yes
Lights: DUSK-DAWN
WHEN ATCT CLSD HIRL RYS 15/33 & 09/27 & MIRL RY 18/36 PRESET LOW INTST; TO INCR INTST & ACTVT MALSR RY 09; REIL RYS 18; 36,15, 33 & 27 AND TWY LGTS - CTAF.
Beacon: white-green (lighted land airport)

Airport Communications

CTAF: 120.6
UNICOM: 122.95
ATIS: 125.85
WX ASOS: 125.85 (630-466-4024)
AURORA GROUND: 121.7 [0700-2100]
AURORA TOWER: 120.6 [0700-2100]
CHICAGO APPROACH: 133.5
CHICAGO DEPARTURE: 133.5
CLEARANCE DELIVERY: 121.7(WHEN AURORA ATCT CLSD)
WX ASOS at DPA (13 nm NE): 124.80 (630-584-2728)
WX AWOS-3 at DKB (14 nm NW): 119.075 (815-748-2350)
WX AWOS-3 at LOT (20 nm SE): 118.525 (815-588-4802)

- ADDNL UNICOM FREQ IS 123.50.
- EMERG FREQ 121.5 NOT AVBL AT TWR.

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
DPAr216/9.1	DUPAGE VOR/DME	108.40	02E
JOTr330/15.3	JOLIET VORTAC	112.30	02E
ORDr241/28.6	CHICAGO O'HARE VOR/DME	113.90	02E
OBKr223/35.7	NORTHBROOK VOR/DME	113.00	02W

NDB name	Hdg/Dist	Freq	Var	ID	
DEKALB	135/14.2	209	02W	DKB	-.. -.- -...
OTTAWA	034/29.9	266	01E	OIX	--- .. -..-
VALLEY	050/39.2	230	00W	VYS	...- -.-- ...

KCGX Merrill C Meigs Airport
Chicago, Illinois, USA

GOING TO CHICAGO?	Rent a Car Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

Lat/Long: 41-51-31.838N / 087-36-28.482W
41-51.53063N / 087-36.47470W
41.8588439 / -87.6079117
(estimated)
Elevation: 593 ft. / 180.7 m (surveyed)
Variation: 03W (2000)
From city: 2 miles S of CHICAGO, IL

Airport Operations

Facility use: Open to the public
Activation date: 03/1985
Sectional chart: CHICAGO
Control tower: yes
ARTCC: CHICAGO CENTER
FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
NOTAMs facility: CGX (NOTAM-D service available)
Attendance: 0600-2200
ARPT CLSD 2200-0600.
Wind indicator: lighted
Segmented circle: no
Lights: DUSK-2200
Beacon: white-green (lighted land airport)
Landing fee: yes
Int'l operations: customs landing rights airport

Airport Communications

CTAF: 121.3
UNICOM: 122.95
ATIS: 127.35 [0600-2200]
MEIGS GROUND: 121.8 [0600-2200]
MEIGS TOWER: 121.3 [0600-2200]
257.8 [0600-2200]
CHICAGO APPROACH: 118.4
126.05
CHICAGO DEPARTURE: 118.4
126.05
WX ASOS at MDW (8 nm SW): 132.75 (773-581-8094)
WX ASOS at ORD (15 nm NW): PHONE 773-462-0118
WX AWOS-3 at GYY (17 nm SE): PHONE 219-944-0010
WX AWOS-3 at IGQ (19 nm S): 119.275 (708-895-9526) [VSBY UNRELBL]

- ATCT OPERATED BY MIDWEST INC.

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
ORDr118/15.3	CHICAGO O'HARE VOR/DME	113.90	02E
CGTr354/21.0	CHICAGO HEIGHTS VORTAC	114.20	02E
OBKr147/26.6	NORTHBROOK VOR/DME	113.00	02W
DPAr091/33.2	DUPAGE VOR/DME	108.40	02E
EONr011/36.3	PEOTONE VORTAC	113.20	02E
JOTr058/36.9	JOLIET VORTAC	112.30	02E

NDB name	Hdg/Dist	Freq	Var	ID	
KEDZI	028/7.9	248	01W	MX	-- -..-
ERMIN	052/13.2	332	01W	HK	.... -.-
MICHIGAN CITY	285/36.6	203	01W	MGC	-- --. -.-.

KDPA Dupage Airport
Chicago/West Chicago, Illinois, USA

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
   Lat/Long: 41-54-28.000N / 088-14-55.000W
             41-54.46667N / 088-14.91667W
             41.9077778 / -88.2486111
             (estimated)
  Elevation: 758 ft. / 231.0 m (surveyed)
  Variation: 01W (1985)
  From city: 29 miles W of central business district of the associated
             city
```

Airport Operations

```
     Facility use: Open to the public
   Sectional chart: CHICAGO
    Control tower: yes
            ARTCC: CHICAGO CENTER
              FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
  NOTAMs facility: DPA (NOTAM-D service available)
       Attendance: CONTINUOUS
 Pattern altitude: 800 ft. AGL / 1558 ft. MSL
   Wind indicator: lighted
 Segmented circle: no
           Lights: ATC-CTL
                   ACTVT VASI RY 10 - 120.9.
           Beacon: white-green (lighted land airport)
 Int'l operations: US CUSTOMS USER FEE ARPT.
```


Airport Communications

```
                  UNICOM: 122.95
                    ATIS: 124.8
                 WX ASOS: 124.80 (630-584-2728)
          DUPAGE GROUND: 121.8
           DUPAGE TOWER: 120.9
                         257.8
                         124.5
       CHICAGO APPROACH: 133.5
      CHICAGO DEPARTURE: 133.5
     CLEARANCE DELIVERY: 119.75
WX ASOS at ARR (13 nm SW): 125.85 (630-466-4024)
 WX ASOS at ORD (16 nm E): PHONE 773-462-0118
WX AWOS-3 at LOT (19 nm S): 118.525 (815-588-4802)
WX ASOS at PWK (20 nm NE): 124.20 (847-465-0291)
```

Nearby radio navigation aids

```
 VOR radial/distance                     VOR name    Freq    Var
```

DPAr075/4.7	DUPAGE VOR/DME	108.40	02E
ORDr251/16.1	CHICAGO O'HARE VOR/DME	113.90	02E
JOTr006/21.9	JOLIET VORTAC	112.30	02E
OBKr217/23.0	NORTHBROOK VOR/DME	113.00	02W
CGTr306/38.6	CHICAGO HEIGHTS VORTAC	114.20	02E

NDB name	Hdg/Dist	Freq	Var	ID
DEANA	250/10.5	350	00E	ME -- .
DEKALB	096/20.5	209	02W	DKB -.. -.- -...

KENW Kenosha Regional Airport
Kenosha, Wisconsin, USA

GOING TO KENOSHA?	Rent a Car Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
   Lat/Long: 42-35-44.547N / 087-55-40.092W
             42-35.74245N / 087-55.66820W
             42.5957075 / -87.9278033
             (estimated)
  Elevation: 743 ft. / 226.5 m (surveyed)
  Variation: 02W (1990)
  From city: 4 miles W of KENOSHA, WI
```

Airport Operations

```
     Facility use: Open to the public
  Sectional chart: CHICAGO CLICK TO BUY IT NOW
    Control tower: yes
            ARTCC: CHICAGO CENTER
              FSS: GREEN BAY FLIGHT SERVICE STATION [1-800-WX-BRIEF]
  NOTAMs facility: ENW (NOTAM-D service available)
       Attendance: 0700-2100
   Wind indicator: lighted
 Segmented circle: yes
           Lights: DUSK-DAWN
                   WHEN ATCT CLSD HIRL RY 06L/24R PRESET ON LOW INTST; TO
                   INCR INTST & ACTVT HIRL RY 14/32; MIRL RY 06R/24L;
                   VASI RY 32; PAPI RYS 24R; 06R & 24L; REIL RYS 14 &
                   24R; MALSR RY 06L - CTAF. VASI RY 14 OPERATE 24 HRS.
           Beacon: white-green (lighted land airport)
Airline operations: PPR FOR UNSKED ACR OPNS WITH MORE THAN 30 PSGR SEATS
                   CALL AMGR 262-653-4160 OR 262-652-2110 RYS 06R/24L &
                   14/32 NOT AVBL FOR ACR OPNS WITH MORE THAN 30 PSGR
                   SEATS.
Int'l operations: customs landing rights airport
```

Airport Communications

```
                     CTAF: 118.6
                   UNICOM: 122.95
                     ATIS: 127.175 [0700-2100]
                  WX ASOS: 127.175 (262-652-7730)
          KENOSHA GROUND: 121.875 [0700-2100]
           KENOSHA TOWER: 118.6 [0700-2100]
                          353.6 [0700-2100]
      MILWAUKEE APPROACH: 120.15 SOUTH
     MILWAUKEE DEPARTURE: 120.15 SOUTH
      CLEARANCE DELIVERY: 118.6
         (WHEN ATCT CLSD): 118.6
WX ASOS at UGN (11 nm S): 132.40 (847-782-0876)
```

WX ASOS at RAC (11 nm NE): 117.70 (262-635-0959)
WX AWOS-3 at BUU (18 nm W): 114.50 (262-757-0907)

- ATCT OPERATED BY MIDWEST AVIATION.

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
ENW at field	KENOSHA VOR/DME	109.20	02W
HRKr209/11.2	HORLICK VOR/DME	117.70	02W
BUUr110/17.4	BURBUN VOR/DME	114.50	01W
OBKr005/22.5	NORTHBROOK VOR/DME	113.00	02W
LJTr173/31.2	TIMMERMAN VOR/DME	112.50	02W
BAEr151/35.0	BADGER VORTAC	116.40	02E
ORDr356/36.5	CHICAGO O'HARE VOR/DME	113.90	02E

NDB name	Hdg/Dist	Freq	Var	ID	
PASER	193/5.4	206	00E	RA	.-. .-
LAKE LAWN	102/30.0	404	00W	LVV	.-.. ...- ...-
WAUKESHA	154/30.1	359	01W	UES	..- . ...

KGYY **Gary/Chicago Airport**
Gary, Indiana, USA

GOING TO GARY?	Rent a Car Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

Lat/Long: 41-36-58.583N / 087-24-46.037W
41-36.97638N / 087-24.76728W
41.6162731 / -87.4127881
(estimated)
Elevation: 592 ft. / 180.4 m (surveyed)
Variation: 02W (1990)
From city: 3 miles NW of GARY, IN

Airport Operations

Airport use: Open to the public
Sectional chart: CHICAGO
Control tower: yes
ARTCC: CHICAGO CENTER
FSS: TERRE HAUTE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
NOTAMs facility: GYY (NOTAM-D service available)
Attendance: CONTINUOUS
Wind indicator: lighted
Segmented circle: yes
Lights: DUSK-DAWN
WHEN ATCT CLSD HIRL RY 12/30 PRESET ON MED INTST; TO INCR INTST & ACTVT MIRL RY 02/20, REIL RYS 02, 12 & 20 & MALSR RY 30 - CTAF.
Beacon: white-green (lighted land airport)
Landing fee: yes, LNDG FEE FOR ACFT 12500 LBS & OVER.
Fire and rescue: ARFF index B

Airport Communications

CTAF: 125.6
ATIS: 120.625
WX AWOS-3: PHONE 219-944-0010
GARY GROUND: 121.9 [0500-2200]
GARY TOWER: 125.6 [0500-2200]
~~CHICAGO~~ APPROACH: 133.1
CHICAGO DEPARTURE: 133.1

Airport Operational Statistics

Aircraft based on the field: 89
Single engine airplanes: 51
Multi engine airplanes: 23
Jet airplanes: 6
Helicopters: 9

Aircraft operations: avg 119/day
53% transient general aviation
40% local general aviation
3% military
2% commercial
2% air taxi

Runway 2/20

Dimensions:	3603 x 100 ft. / 1098 x 30 m	
Surface:	asphalt, in good condition	
Weight limitations:	Single wheel: 18000 lbs	
	Double wheel: 28000 lbs	
Runway edge lights:	medium intensity	
	RUNWAY 2	**RUNWAY 20**
Traffic pattern:	left	left
Runway heading:	023 magnetic, 021 true	203 magnetic, 201 true
Markings:	nonprecision instrument	nonprecision instrument
Markings condition:	good	good
Latitude:	41-36.73723N	41-37.29035N
Longitude:	087-25.10542W	087-24.81972W
Elevation:	589.5 ft.	589.7 ft.
Threshold crossing height:	35 ft. AGL	39 ft. AGL
Visual glide path angle:	3.00 degrees	3.00 degrees
Visual slope indicator:	2-light PAPI on left	2-light PAPI on left
Runway end identifier lights:	yes	yes
Centerline lights:	no	no
Touchdown point:	yes	yes
	Elevation 591.0 ft	Elevation 591.0 ft
	lights: no	lights: no
OBSTRUCTIONS:	ROAD	ROAD
Height:	42 ft.	19 ft.
Slope to clear:	20:1	20:1
Distance from threshold:	1050 ft.	580 ft.
Distance from centerline:	0 ft. both sides	0 ft. both sides

Runway 12/30

Dimensions:	7000 x 150 ft. / 2134 x 46 m	
Surface:	asphalt/grooved, in good condition	
Weight limitations:	Single wheel: 75000 lbs	
	Double wheel: 157000 lbs	
	Double tandem: 250000 lbs	
Runway edge lights:	high intensity	
	RUNWAY 12	**RUNWAY 30**
Traffic pattern:	left	left
Runway heading:	126 magnetic, 124 true	306 magnetic, 304 true
Markings:	nonprecision instrument	precision instrument
Markings condition:	good	good
Latitude:	41-37.28068N	41-36.63348N
Longitude:	087-25.30228W	087-24.03135W
Elevation:	590.2 ft.	591.5 ft.
Threshold crossing height:	50 ft. AGL	50 ft. AGL
Visual glide path angle:	3.00 degrees	3.00 degrees
Visual slope indicator:	4-light PAPI on left	4-light PAPI on left
Approach lights:		MALSR: 1,400 foot medium intensity approach lighting system with runway alignment indicator lights
Runway end identifier lights:	yes	no
Centerline lights:	no	no

KIGQ Lansing Municipal Airport
Chicago, Illinois, USA

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

Lat/Long: 41-32-23.600N / 087-31-55.800W
41-32.39333N / 087-31.93000W
41.5398889 / -87.5321667
(estimated)
Elevation: 616 ft. / 187.8 m (surveyed)
Variation: 02W (1995)
From city: 21 miles S of CHICAGO, IL

Airport Operations

Facility use: Open to the public
Sectional chart: CHICAGO
Control tower: no
ARTCC: CHICAGO CENTER
FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
NOTAMs facility: IGQ (NOTAM-D service available)
Attendance: 0700-1900
Wind indicator: lighted
Segmented circle: no
Lights: DUSK-DAWN
MIRL RY 09/27 PRESET ON LOW INTST; TO INCR INTST & ACTVT REIL RY 09 & VASI RY 27 - CTAF.
Beacon: white-green (lighted land airport)

Airport Communications

CTAF: 122.7
UNICOM: 122.7
WX AWOS-3: 119.275 (708-895-9526) [VSBY UNRELBL]
CHICAGO APPROACH: 118.4
CHICAGO DEPARTURE: 118.4

Airport Operational Statistics

Aircraft based on the field: 186
Single engine airplanes: 165
Multi engine airplanes: 15
Helicopters: 4
Ultralights: 2

Aircraft operations: average 178/day
49% local general aviation
43% transient general aviation
8% air taxi

Runway Information

Runway 9/27

Dimensions:	3646 x 75 ft. / 1111 x 23 m	
Surface:	asphalt, in fair condition	
Weight limitations:	Single wheel: 125000 lbs	
Runway edge lights:	medium intensity	
	RUNWAY 9	RUNWAY 27
Traffic pattern:	left	left
Runway heading:	092 magnetic, 090 true	272 magnetic, 270 true
Markings:	basic	nonprecision instrument
Markings condition:	good	good
Latitude:	41-32.39370N	41-32.39230N
Longitude:	087-32.32888W	087-31.52987W
Elevation:	613.7 ft.	616.0 ft.
Threshold crossing height:		26 ft. AGL
Visual glide path angle:		3.00 degrees
Visual slope indicator:		4-box VASI on left
Runway end identifier lights:	yes RY 09 REIL OTS INDEFLY.	
DISPLACED THRESHOLD:	yes	no
DT distance:	225 ft.	
DT latitude:	41-32.39382N	
DT longitude:	087-32.27955W	
DT elevation:	614.3 ft.	
TOUCHDOWN POINT:	yes	yes
TD elevation:	616.0 ft.	616.0 ft.
OBSTRUCTIONS:	BLDG	TOWER
Marked:		1
Height:	27 ft.	146 ft.
Slope to clear:	4:1	28:1
Distance from threshold:	318 ft.	4325 ft.
Distance from centerline:	71 ft.	665 ft. right
Additional obstruction remarks:	APCH RATIO 20:1 AT DSPLCD THLD. BLKD BY ROAD.	

Runway 18/36

Dimensions:	2320 x 77 ft. / 707 x 23 m	
Surface:	turf, in fair condition	
Operational restrictions:	IS CLSD INDEFLY.	
	RUNWAY 18	RUNWAY 36
Traffic pattern:	left	left
Latitude:	41-32.51878N	41-32.13545N
Longitude:	087-31.80247W	087-31.80247W
DISPLACED THRESHOLD:	yes	no
DT distance:	350 ft.	
Touchdown point:	no	no
Obstructions:	POLE	TREES

Airport Operational Statistics

Aircraft based on the field:	186
Single engine airplanes:	165
Multi engine airplanes:	15
Helicopters:	4
Ultralights:	2

Aircraft operations: average 178/day
49% local general aviation
43% transient general aviation
8% air taxi

KIKK Greater Kankakee Airport
Kankakee, Illinois, USA

GOING TO KANKAKEE?	Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
  Lat/Long: 41-04-17.000N / 087-50-46.600W
            41-04.28333N / 087-50.77667W
            41.0713889 / -87.8462778
            (estimated)
 Elevation: 630 ft. / 192.0 m (surveyed)
 Variation: 00E (1980)
 From city: 3 miles S of KANKAKEE, IL
```

Airport Operations

```
     Facility use: Open to the public
   Sectional chart: CHICAGO CLICK TO BUY IT NOW
    Control tower: no
            ARTCC: CHICAGO CENTER
              FSS: KANKAKEE FLIGHT SERVICE STATION (on field)
                   [1-800-WX-BRIEF]
   NOTAMs facility: IKK (NOTAM-D service available)
       Attendance: APR-OCT 0700-2100, NOV-MAR 0700-1900
 Pattern altitude: 800 ft. AGL / 1430 ft. MSL
   Wind indicator: lighted
 Segmented circle: yes
           Lights: DUSK-DAWN
                   HIRL RY 04/22 PRESET ON LOW INTST; TO INCR INTST &
                   ACTVT MALSR RY 04 & MIRL RY 16/34 & REIL RYS 04 & 22 -
                   CTAF.
           Beacon: white-green (lighted land airport)
```

Airport Communications

```
    CTAF: 123.0
  UNICOM: 123.0
WX AWOS-3: 111.60 (815-939-4044)
```

- APCH/DEP SERVICE PROVIDED BY CHICAGO ARTCC ON FREQS 132.5/258.1 (KANKAKEE RCAG).

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
IKK at field	KANKAKEE VOR/DME	111.60	00E
EONr190/12.2	PEOTONE VORTAC	113.20	02E
CGTr203/29.1	CHICAGO HEIGHTS VORTAC	114.20	02E
RBSr024/32.7	ROBERTS VOR/DME	116.80	02E
JOTr141/35.6	JOLIET VORTAC	112.30	02E

Runway 4/22

Dimensions:	5979 x 100 ft. / 1822 x 30 m	
Surface:	asphalt/porous friction courses, in good condition	
Weight limitations:	Single wheel: 60000 lbs Double wheel: 95000 lbs	
Runway edge lights:	high intensity	
	RUNWAY 4	RUNWAY 22
Traffic pattern:	left	left
Runway heading:	038	218
Markings:	precision instrument	nonprecision instrument
Markings condition:	good	good
Latitude:	41-03.94757N	41-04.71997N
Longitude:	087-51.29270W	087-50.48580W
Elevation:	624.9 ft.	630.1 ft.
Threshold crossing height:	49 ft. AGL	35 ft. AGL
Visual glide path angle:	3.00 degrees	3.00 degrees
Visual slope indicator:	4-light PAPI on left	4-light PAPI on left
Approach lights:	MALSR: 1,400 foot medium intensity approach lighting system with runway alignment indicator lights	
Runway end identifier lights:	yes	yes
Instrument approach:	ILS	
Displaced threshold:	no	no
Touchdown point:	no	no

Runway 16/34

Dimensions:	4399 x 75 ft. / 1341 x 23 m	
Surface:	asphalt, in good condition	
Weight limitations:	Single wheel: 30000 lbs Double wheel: 40000 lbs	
Runway edge lights:	medium intensity	
	RUNWAY 16	RUNWAY 34
Traffic pattern:	left	left
Runway heading:	161	341
Markings:	basic	basic
Markings condition:	poor	poor
Latitude:	41-04.55898N	41-03.87385N
Longitude:	087-50.77732W	087-50.46687W
Elevation:	621.5 ft.	617.5 ft.
Threshold crossing height:	35 ft. AGL	35 ft. AGL
Visual glide path angle:	3.00 degrees	3.00 degrees
Visual slope indicator:	4-light PAPI on left	4-light PAPI on left
Displaced threshold:	no	no
Touchdown point:	no	no
Obstructions:	TREES	ROAD

KJOT Joliet Regional Airport
Joliet, Illinois, USA

GOING TO JOLIET?	Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
  Lat/Long: 41-31-04.100N / 088-10-31.900W
            41-31.06833N / 088-10.53167W
            41.5178056 / -88.1755278
            (estimated)
 Elevation: 581 ft. / 177.1 m (surveyed)
 Variation: 01W (1985)
 From city: 4 miles W of JOLIET, IL
```

Airport Operations

```
     Facility use: Open to the public
   Sectional chart: CHICAGO CLICK TO BUY IT NOW
    Control tower: no
            ARTCC: CHICAGO CENTER
              FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
   NOTAMs facility: JOT (NOTAM-D service available)
        Attendance: APR-OCT 0700-2100, NOV-MAR 0700-1900
    Wind indicator: lighted
  Segmented circle: no
            Lights: DUSK-DAWN
                    MIRL RY 12/30 PRESET ON LOW INTST - TO ACTVT HIGHER
                    INTST - CTAF.
            Beacon: white-green (lighted land airport)
```

Airport Communications

```
                        CTAF: 122.7
                      UNICOM: 122.7
                  WX AWOS-3: 119.975 (815-730-9560)
           CHICAGO APPROACH: 119.35
          CHICAGO DEPARTURE: 119.35
                         IC: 119.35
 WX AWOS-3 at LOT (7 nm NE): 118.525 (815-588-4802)
WX AWOS-3 at C09 (12 nm SW): 118.175 (815-941-1815)
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
JOTr103/6.6	JOLIET VORTAC	112.30	02E
EONr309/22.8	PEOTONE VORTAC	113.20	02E
DPAr159/23.7	DUPAGE VOR/DME	108.40	02E
CGTr269/27.1	CHICAGO HEIGHTS VORTAC	114.20	02E
IKKr331/30.4	KANKAKEE VOR/DME	111.60	00E
ORDr201/30.7	CHICAGO O'HARE VOR/DME	113.90	02E

NDB name	Hdg/Dist	Freq	Var	ID
OTTAWA	072/31.9	266	01E	OIX --- .. -..-
DEKALB	138/34.5	209	02W	DKB -.. -.- -...

KLOT Lewis University Airport
Chicago/Romeoville, Illinois, USA

GOING TO CHICAGO/ROMEOVILLE?	Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
    Lat/Long: 41-36-30.048N / 088-05-38.553W
              41-36.50080N / 088-05.64255W
              41.6083467 / -88.0940425
              (estimated)
  Elevation: 673 ft. / 205.1 m (surveyed)
  Variation: 02W (2000)
  From city: 20 miles SW of central business district of the associated
              city
```

Airport Operations

```
      Facility use: Open to the public
   Sectional chart: CHICAGO
     Control tower: no
             ARTCC: CHICAGO CENTER
               FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
   NOTAMs facility: LOT (NOTAM-D service available)
        Attendance: 0700-2100
    Wind indicator: lighted
  Segmented circle: no
            Lights: DUSK-DAWN
                    MIRL RY 09/27 PRESET ON LOW INTST; TO INCR INTST ACTVT
                    - CTAF. ACTVT REIL & PAPI RY 09 - CTAF.
            Beacon: white-green (lighted land airport)
```


Airport Communications

```
                   CTAF: 122.8
                 UNICOM: 122.8
              WX AWOS-3: 118.525 (815-588-4802)
      CHICAGO APPROACH: 119.35
     CHICAGO DEPARTURE: 119.35
                     IC: 119.35
```

Airport Operational Statistics

```
  Aircraft based on the field: 241      Aircraft operations: average 252/day
      Single engine airplanes: 224               65% local general aviation
       Multi engine airplanes:  14               33% transient general aviation
                Jet airplanes:   3                2% air taxi
```

Runway Information

Runway 9/27

Dimensions:	5697 x 75 ft. / 1736 x 23 m	
Surface:	asphalt, in good condition	
Runway edge lights:	medium intensity	
	RUNWAY 9	RUNWAY 27
Traffic pattern:	left	left
Markings:	nonprecision instrument	nonprecision instrument
Markings condition:	good	good
Latitude:	41-36.48228N	41-36.51932N
Longitude:	088-06.26702W	088-05.01810W
Elevation:	673.1 ft.	666.1 ft.
Threshold crossing height:	41 ft. AGL	
Visual glide path angle:	3.00 degrees	
Visual slope indicator:	4-light PAPI on left	
Runway end identifier lights:	yes	
Centerline lights:	no	no
Instrument approach:	LOC/DME	
DISPLACED THRESHOLD:	no	yes
DT distance:		197 ft.
DT latitude:		41-36.51798N
DT longitude:		088-05.06132W
Touchdown point:	no	no
OBSTRUCTIONS:	NONE	TREE
Height:		40 ft.
Slope to clear:		23:1
Distance from threshold:		1129 ft.
Distance from centerline:		301 ft.
Additional obstruction remarks:		APCH SLOPE TO DSPLCD THLD 33:1.

Airport Operational Statistics

Aircraft based on the field:	241	Aircraft operations:	average 252/day
Single engine airplanes:	224	65%	local general aviation
Multi engine airplanes:	14	33%	transient general aviation
Jet airplanes:	3	2%	air taxi

KMDW Chicago Midway Airport
Chicago, Illinois, USA

GOING TO CHICAGO?	Book a Flight	Rent a Car	Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

Lat/Long: 41-47-09.537N / 087-45-08.728W
41-47.15895N / 087-45.14547W
41.7859825 / -87.7524244
(estimated)
Elevation: 620 ft. / 189.0 m (surveyed)
Variation: 01W (1985)
From city: 9 miles SW of CHICAGO, IL

Airport Operations

Facility use: Open to the public
Sectional chart: CHICAGO
Control tower: yes
ARTCC: CHICAGO CENTER
FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
NOTAMs facility: MDW (NOTAM-D service available)
Attendance: CONTINUOUS
Wind indicator: lighted
Segmented circle: no
Lights: DUSK-DAWN
Beacon: white-green (lighted land airport)
Landing fee: yes
Fire and rescue: ARFF index D
Airline operations: RYS 13R/31L; 13L/31R & 04L/22R NOT AVBL FOR ACR OPNS WITH MORE THAN 30 PSGR SEATS.
Int'l operations: international airport of entry

Airport Communications

UNICOM: 122.95
ATIS: 132.75
WX ASOS: 132.75 (773-581-8094)
MIDWAY GROUND: 121.65
MIDWAY TOWER: 118.7
226.3
CHICAGO APPROACH: 118.4
126.05
CHICAGO DEPARTURE: 118.4
126.05
CLEARANCE DELIVERY: 121.85
PRE-TAXI CLEARANCE: 121.85
CLASS C: 226.3
CLASS C IC: 119.45
CLASS C/S: 135.2
EMERG: 121.5
WX ASOS at ORD (13 nm NW): PHONE 773-462-0118

WX AWOS-3 at IGQ (18 nm SE): 119.275 (708-895-9526) [VSBY UNRELBL]
WX AWOS-3 at GYY (18 nm SE): PHONE 219-944-0010
WX AWOS-3 at LOT (19 nm SW): 118.525 (815-588-4802)

Nearby radio navigation aids

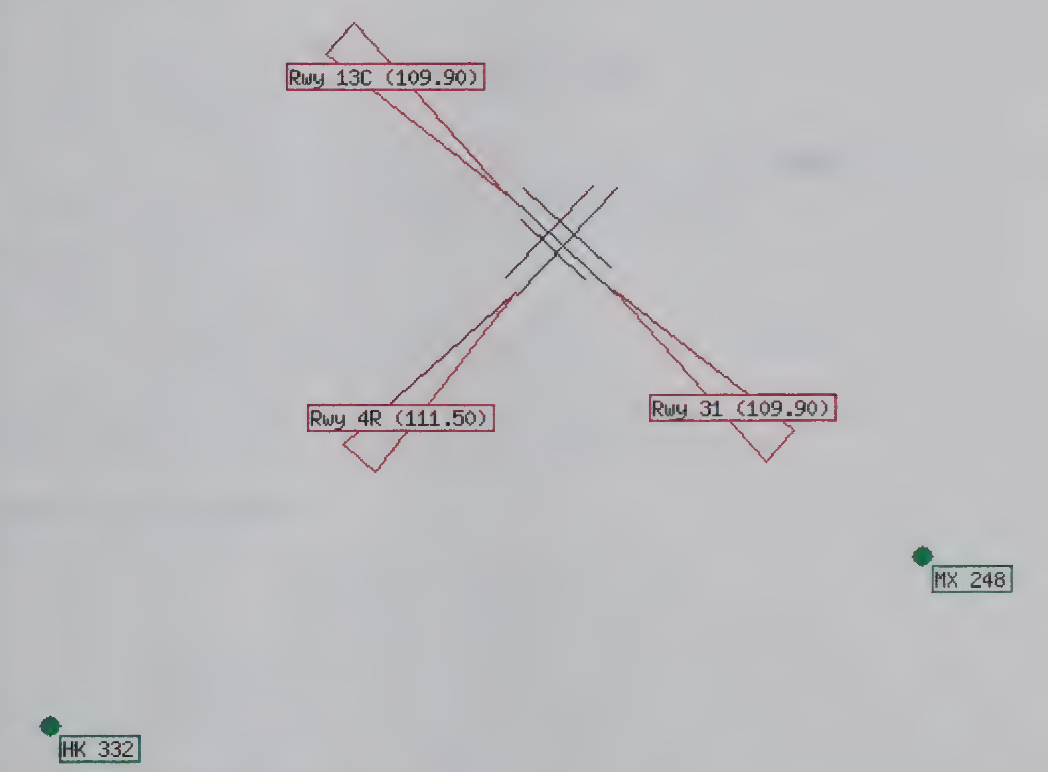
VOR radial/distance	VOR name	Freq	Var
ORDr149/13.9	CHICAGO O'HARE VOR/DME	113.90	02E
CGTr332/18.4	CHICAGO HEIGHTS VORTAC	114.20	02E
DPAr101/27.4	DUPAGE VOR/DME	108.40	02E
OBKr163/27.6	NORTHBROOK VOR/DME	113.00	02W
JOTr058/29.2	JOLIET VORTAC	112.30	02E
EONr001/31.0	PEOTONE VORTAC	113.20	02E

NDB name	Hdg/Dist	Freq	Var	ID	
KEDZI	315/3.9	248	01W	MX	-- -..-
ERMIN	044/5.5	332	01W	HK	.... -.-

Chicago-Midway
KMDW

ATIS 132.8 MHz
Mag dev 0.1 Degrees
Altitude 617 ft. (188 meters)
Longitude W 87.75242615
Latitude N 41.78598022

Runway	Approach	ILS	Length	Width	Surface
13C	133	109.90	6522	150	Concrete
13L	133		5142	150	Asphalt
13R	133		3859	60	Concrete
22L	223		6446	150	Asphalt
22R	223		5509	150	Asphalt
31	313	109.90	6522	150	Concrete
31L	313		3859	60	Concrete
31R	313		5142	150	Asphalt
4L	43		5509	150	Asphalt
4R	43	111.50	6446	150	Asphalt



KMKE General Mitchell International Airport
Milwaukee, Wisconsin, USA

GOING TO MILWAUKEE?	Book a Flight	Rent a Car	Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
   Lat/Long: 42-56-50.000N / 087-53-47.700W
             42-56.83333N / 087-53.79500W
             42.9472222 / -87.8965833
             (estimated)
  Elevation: 723 ft. / 220.4 m (surveyed)
  Variation: 02W (1995)
  From city: 5 miles S of MILWAUKEE, WI
```

Airport Operations

```
      Facility use: Open to the public
   Sectional chart: CHICAGO CLICK TO BUY IT NOW
     Control tower: yes
             ARTCC: CHICAGO CENTER
               FSS: GREEN BAY FLIGHT SERVICE STATION [1-800-WX-BRIEF]
   NOTAMs facility: MKE (NOTAM-D service available)
        Attendance: CONTINUOUS
    Wind indicator: lighted
  Segmented circle: no
            Lights: DUSK-DAWN
            Beacon: white-green (lighted land airport)
   Fire and rescue: ARFF index C
Airline operations: ARFF INDEX D EQUIP AVBL UPON REQUEST.
  Int'l operations: customs landing rights airport
```

Airport Communications

```
                 UNICOM: 122.95
                   ATIS: 126.4
               WX ASOS: PHONE 414-769-7161
       MILWAUKEE GROUND: 121.8
                         263.125
        MILWAUKEE TOWER: 119.1
                         325.8
     MILWAUKEE APPROACH: 118.0(B)
                         126.5(A)
                         307.0
                         317.725
    MILWAUKEE DEPARTURE: 119.65(B)
                         125.35(A)
                         307.0
                         317.725
     CLEARANCE DELIVERY: 120.8
            AS ASSIGNED: 127.85
                CLASS C: 118.0(B)
                         317.725
```

```
             CLASS C IC: 126.5(A)
                         307.0
                  EMERG: 121.5
                         243.0
                   OPNS: 139.5
                         311.0
                         321.0
  WX ASOS at RAC (12 nm S): 117.70 (262-635-0959)
WX AWOS-3 at UES (16 nm W): 118.875 (262-521-5226) [AWOS-3 UNAVBL
                         0600-2100]
```

- (A) WEST OF 1L-19R EXTENDED LOC CRS OF ACTIVE RWY AND NORTH OF 7R-25L EXTENDED CRS OF ACTIVE RWY.
- (B) EAST OF 1L-19R EXTENDED LOC CRS OF ACTIVE RWY AND SOUTH OF 7R-25L EXTENDED CRS OF ACTIVE RWY.

Nearby radio navigation aids

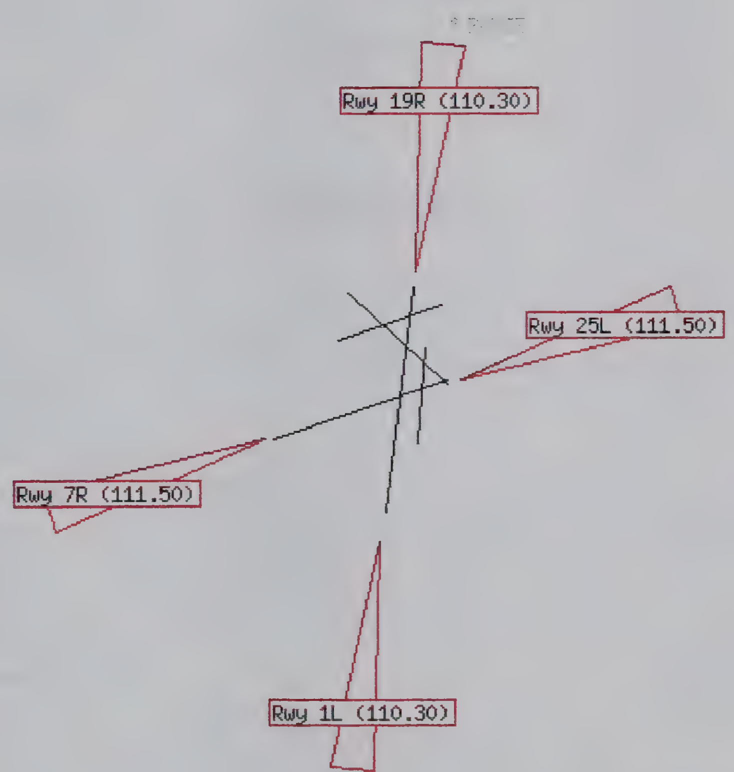
VOR radial/distance	VOR name	Freq	Var
LJTr150/11.5	TIMMERMAN VOR/DME	112.50	02W
HRKr344/11.7	HORLICK VOR/DME	117.70	02W
BAEr119/19.8	BADGER VORTAC	116.40	02E
ENWr006/20.9	KENOSHA VOR/DME	109.20	02W
BUUr050/23.6	BURBUN VOR/DME	114.50	01W
BJBr162/(30.2)	WEST BEND VOR	109.80	01W

NDB name	Hdg/Dist	Freq	Var	ID	
TEELS	072/6.7	242	02W	GM	--. --
YANKS	189/6.8	260	02W	BL	-... .-..
WAUKESHA	112/16.0	359	01W	UES	..- . ...
KETTLE MORAINE	162/30.4	329	01W	LLE	.-.. .-.. .
HARTFORD	138/32.5	200	00E	HXF	.... -..- ..-.
LAKE LAWN	064/34.1	404	00W	LVV	.-.. ...- ...-
ROCK RIVER	112/38.8	371	01W	RYV	.-. -.-- ...-

Gen Mitchell Intl
KMKE

ATIS 126.4 MHz
Mag dev 0.3 Degrees
Altitude 722 ft. (220 meters)
Longitude W 87.89658356
Latitude N 42.94721603

Runway	Approach	ILS	Length	Width	Surface
13	132		5868	150	Concrete
19L	187		4183	150	Concrete
19R	187	110.30	9690	200	Asphalt
1L	7	110.30	9690	200	Asphalt
1R	7		4183	150	Concrete
25L	251	111.50	8011	150	Asphalt
25R	251		4800	100	Asphalt
31	312		5868	150	Concrete
7L	71		4800	100	Asphalt
7R	71	111.50	8011	150	Asphalt



KMWC Lawrence J Timmerman Airport
Milwaukee, Wisconsin, USA

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

Lat/Long: 43-06-37.400N / 088-02-03.919W
43-06.62333N / 088-02.06532W
43.1103889 / -88.0344219
(estimated)
Elevation: 745 ft. / 227.1 m (surveyed)
Variation: 01W (1985)
From city: 5 miles NW of MILWAUKEE, WI

Airport Operations

Facility use: Open to the public
Sectional chart: CHICAGO
Control tower: yes
ARTCC: CHICAGO CENTER
FSS: GREEN BAY FLIGHT SERVICE STATION [1-800-WX-BRIEF]
NOTAMs facility: MWC (NOTAM-D service available)
Attendance: MAY-SEP 0700-2200, OCT-APR 0700-2100
Pattern altitude: 1000 ft. AGL / 1745 ft. MSL
Wind indicator: yes
Segmented circle: no
Lights: DUSK-DAWN
WHEN ATCT CLSD ACTVT MIRL RY 04L/22R VASI & REIL RYS 04L & 22R; MIRL RY 15L/33R; VASI RYS 15L & 33R & REIL RY 15L - CTAF.
Beacon: white-green (lighted land airport)

Airport Communications

CTAF: 120.5
UNICOM: 122.95
ATIS: 128.3
TIMMERMAN GROUND: 121.7 [0700-2100]
TIMMERMAN TOWER: 120.5 [0700-2100]
MILWAUKEE APPROACH: 128.7 NORTH
MILWAUKEE DEPARTURE: 128.7 NORTH
CLEARANCE DELIVERY: 121.7
(WHEN ATCT CLSD): 121.7
WX AWOS-3 at UES (10 nm SW): 118.875 (262-521-5226) [AWOS-3 UNAVBL 0600-2100]
WX ASOS at MKE (12 nm SE): PHONE 414-769-7161
WX AWOS-3 at ETB (19 nm N): 120.00 (262-334-6161)

Runway 4L/22R

Dimensions:	3202 x 75 ft. / 976 x 23 m	
Surface:	asphalt, in good condition	
Weight limitations:	Single wheel: 30000 lbs	
Runway edge lights:	medium intensity	
	RUNWAY 4L	RUNWAY 22R
Traffic pattern:	left	left
Runway heading:	037 magnetic, 036 true	217 magnetic, 216 true
Markings:	nonprecision instrument	nonprecision instrument
Markings condition:	fair	fair
Latitude:	43-06.42608N	43-06.85155N
Longitude:	088-02.28705W	088-01.86253W
Elevation:	737.1 ft.	738.3 ft.
Threshold crossing height:	44 ft. AGL	36 ft. AGL
Visual glide path angle:	4.00 degrees	3.00 degrees
Visual slope indicator:	4-box VASI on left	4-box VASI on left
Runway end identifier lights:	yes	yes
Centerline lights:	no	no
Displaced threshold:	no	no
Touchdown point:	no	no
OBSTRUCTIONS:	TREE	TREE
Height:	58 ft.	70 ft.
Slope to clear:	17:1	18:1
Distance from threshold:	1200 ft.	1460 ft.
Distance from centerline:	100 ft.	230 ft.
Additional obstruction remarks:		ROAD AT 190' 245'R, +4'SIGN AT 150' 240'R.

Runway 4R/22L

Dimensions:	2862 x 275 ft. / 872 x 84 m	
Surface:	turf, in good condition	
	RUNWAY 4R	RUNWAY 22L
Traffic pattern:	left	left
Runway heading:	036 magnetic, 035 true	217 magnetic, 216 true
Latitude:	43-06.38172N	43-06.76200N
Longitude:	088-02.16437W	088-01.78463W
Elevation:	731.9 ft.	736.5 ft.
Runway end identifier lights:	no	no
Centerline lights:	no	no
Displaced threshold:	no	no
Touchdown point:	no	no
Obstructions:	TREE	TREES

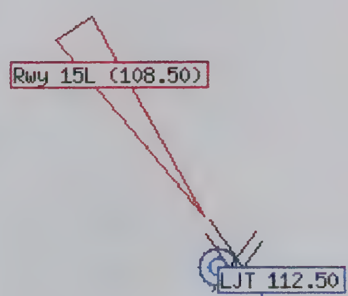
Runway 15L/33R

Dimensions:	4106 x 75 ft. / 1252 x 23 m	
Surface:	asphalt, in good condition	
Weight limitations:	Single wheel: 30000 lbs	
Runway edge lights:	medium intensity	
	RUNWAY 15L	RUNWAY 33R
Traffic pattern:	left	left
Runway heading:	147 magnetic, 146 true	327 magnetic, 326 true
Markings:	nonprecision instrument	nonprecision instrument
Markings condition:	fair	fair
Latitude:	43-06.94923N	43-06.39157N
Longitude:	088-02.31723W	088-01.79592W
Elevation:	743.9 ft.	743.7 ft.
Threshold crossing height:	41 ft. AGL	26 ft. AGL
Visual glide path angle:	3.00 degrees	3.00 degrees
Visual slope indicator:	4-box VASI on left	4-box VASI on left
Runway end identifier lights:	yes	no
Centerline lights:	no	no

Timmerman
KMWC

ATIS 128.3 MHz
Mag dev 0.3 Degrees
Altitude 745 ft. (227 meters)
Longitude W 88.03442383
Latitude N 43.11092377

Runway	Approach	ILS	Length	Width	Surface
15L	145	108.50	4107	75	Asphalt
15R	146		3251	275	Dirt
22L	215		2859	275	Dirt
22R	216		3202	75	Asphalt
33L	326		3251	275	Dirt
33R	325		4107	75	Asphalt
4L	36		3202	75	Asphalt
4R	35		2859	275	Dirt



KORD Chicago, Illinois, USA

GOING TO CHICAGO?

Book a Flight | Rent a Car | Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 05 AUGUST 2004

Location

FAA Identifier: ORD
Lat/Long: 41-58-42.972N / 087-54-17.429W
41-58.71620N / 087-54.29048W
41.9786033 / -87.9048414
(estimated)
Elevation: 668 ft. / 203.6 m (surveyed)
Variation: 00E (1980)
From city: 14 miles NW of CHICAGO, IL

Airport Operations

Airport use: Open to the public
Sectional chart: CHICAGO
Control tower: yes
ARTCC: CHICAGO CENTER
FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
NOTAMs facility: ORD (NOTAM-D service available)
Attendance: CONTINUOUS
Wind indicator: lighted
Segmented circle: no
Lights: DUSK-DAWN
Beacon: white-green (lighted land airport)
Landing fee: yes
Fire and rescue: ARFF index E
International operations: customs landing rights airport

Airport Communications

UNICOM: 122.95
ATIS: 135.4(773-601-8921) 269.9
WX ASOS: PHONE 773-462-0118
O HARE GROUND: 121.675 121.75(OBND) 121.9(IBND) 348.6
O HARE TOWER: 120.75(SOUTH) 126.9(NORTH) 127.925 132.7 390.9
CHICAGO APPROACH: 119.0(360-179) 128.45(180-359) 284.0(180-359)
393.1(360-179) 121.15 124.35 125.7(180-359)
CHICAGO DEPARTURE: 125.0(340-159) 125.4(220-339) 127.4(160-219)
269.5(160-219) 307.2(220-339) 337.4(340-159)
CLEARANCE DELIVERY: 121.6 119.25
ALCP: 252.1
CLASS B: 120.55(NORTH) 128.45(180-359) 133.5(SOUTH)
284.0(180-359) 290.2(NORTH) 371.9(SOUTH)
CLASS B IC: 119.0(360-179) 393.1(360-179)
CLASS B/S: 134.4
EMERG: 121.5 243.0
IC: 126.9(NORTH)
METERING: 121.675

PTC/S: 119.25
VFR ADV: 126.8
WX ASOS at PWK (8 nm N): 124.20 (847-465-0291)
WX ASOS at MDW (13 nm SE): 132.75 (773-581-8094)
WX ASOS at DPA (16 nm W): 124.80 (630-584-2728)

- ASR-7 (S) LCTD LAT 41-58-48.6N/LONG 087-55-40.0W.
- CLASS B FREQS 120.55/290.2 FOR VFR AIRCRAFT REQUESTING TRAFFIC ADVISORIES OR TO TRANSITION CLASS B NORTH OF OHARE.
- CLASS B FREQS 133.5/371.9 FOR VFR AIRCRAFT REQUESTING TRAFFIC ADVISORIES OR TO TRANSITION CLASS B SOUTH OF OHARE.
- ASR-7 (N) UNUSBL 166-193 8-50 NM.
- IF UNABLE TO CONTACT CHICAGO APCH/DEP CTL ON 133.1; CALL 312-686-0681 TO OBTAIN IFR CLNC.

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
ORD at field	CHICAGO O'HARE VOR/DME	113.90	02E
OBKr174/14.7	NORTHBROOK VOR/DME	113.00	02W
DPAr073/20.6	DUPAGE VOR/DME	108.40	02E
CGTr330/31.8	CHICAGO HEIGHTS VORTAC	114.20	02E
JOTr034/31.9	JOLIET VORTAC	112.30	02E
ENWr180/37.2	KENOSHA VOR/DME	109.20	02W

NDB name	Hdg/Dist	Freq	Var	ID
DEANA	083/5.5	350	00E	ME -- .
DEKALB	088/35.9	209	02W	DKB -.. -.- -...

Airport Services

Fuel available: 100LL JET-A1
Airframe service: MAJOR
Powerplant service: MAJOR
Bottled oxygen: HIGH
Bulk oxygen: HIGH/LOW

Runway Information

Runway 14R/32L

Dimensions: 13000 x 200 ft. / 3962 x 61 m
Surface: asphalt/concrete/grooved, in good condition
Weight limitations: Single wheel: 100000 lbs
Double wheel: 185000 lbs
Double tandem: 350000 lbs
Runway edge lights: high intensity
Operational restrictions: POSSIBLE LOW LEVEL TURBULENCE ON AER 14R.

	RUNWAY 14R	RUNWAY 32L
Latitude:	41-59.42612N	41-57.78708N
Longitude:	087-55.98838W	087-54.14383W
Elevation:	665.5 ft.	649.4 ft.
Traffic pattern:	left	left
Runway heading:	140	320
Markings:	precision, in good condition	precision, in good condition
Visual slope indicator:	4-light PAPI on right (3.00	

	degrees glide path)	
RVR equipment:	touchdown, midfield, rollout	touchdown, midfield, rollout
Approach lights:	ALSF2: standard 2,400 foot high intensity approach lighting system with centerline sequenced flashers (category II or III)	MALSR: 1,400 foot medium intensity approach lighting system with runway alignment indicator lights
Runway end identifier lights:	no	no
Centerline lights:	yes	yes
Touchdown point:	yes, lighted	yes, lighted
Instrument approach:	ILS/DME	ILS/DME
Obstructions:	63 ft. trees, 3025 ft. from runway, 56 ft. right of centerline, 44:1 slope to clear	37 ft. pole, 1896 ft. from runway, 735 ft. left of centerline, 45:1 slope to clear

Runway 9R/27L

Dimensions:	10144 x 150 ft. / 3092 x 46 m	
Surface:	asphalt/concrete/grooved, in good condition	
Weight limitations:	Single wheel: 100000 lbs Double wheel: 185000 lbs Double tandem: 350000 lbs	
Runway edge lights:	high intensity	
	RUNWAY 9R	**RUNWAY 27L**
Latitude:	41-58.14078N	41-58.14422N
Longitude:	087-55.26180W	087-53.02372W
Elevation:	665.7 ft.	651.3 ft.
Traffic pattern:	left	left
Runway heading:	090	270
Markings:	precision, in good condition	precision, in good condition
Visual slope indicator:	4-light PAPI on right (2.90 degrees glide path)	4-light PAPI on left (3.00 degrees glide path)
RVR equipment:	touchdown, rollout	touchdown, rollout
Approach lights:	MALSR: 1,400 foot medium intensity approach lighting system with runway alignment indicator lights	MALSR: 1,400 foot medium intensity approach lighting system with runway alignment indicator lights
Runway end identifier lights:	no	no
Centerline lights:	yes	yes
Touchdown point:	yes, lighted	yes, lighted
Instrument approach:	ILS/DME	ILS/DME
Obstructions:	none	56 ft. sign, 2700 ft. from runway, 723 ft. left of centerline, 44:1 slope to clear

Runway 14L/32R

Dimensions:	10005 x 150 ft. / 3050 x 46 m	
Surface:	asphalt/grooved, in good condition	
Weight limitations:	Single wheel: 100000 lbs Double wheel: 185000 lbs Double tandem: 350000 lbs	
Runway edge lights:	high intensity	
	RUNWAY 14L	**RUNWAY 32R**
Latitude:	42-00.14610N	41-58.88430N
Longitude:	087-54.92208W	087-53.50277W
Elevation:	652.7 ft.	648.1 ft.
Traffic pattern:	left	left

Runway heading:	090	270
Markings:	precision, in good condition	precision, in good condition
Visual slope indicator:	4-light PAPI on left (3.00 degrees glide path)	4-light PAPI on right (3.00 degrees glide path)
RVR equipment:	touchdown	touchdown
Approach lights:	MALSR: 1,400 foot medium intensity approach lighting system with runway alignment indicator lights	MALSR: 1,400 foot medium intensity approach lighting system with runway alignment indicator lights
Runway end identifier lights:	no	no
Centerline lights:	yes	yes
Touchdown point:	yes, lighted	yes, lighted
Instrument approach:	ILS	ILS
Obstructions:	none	24 ft. ant, 1105 ft. from runway, 587 ft. left of centerline, 37:1 slope to clear

Runway 4L/22R

Dimensions: 7500 x 150 ft. / 2286 x 46 m
Surface: asphalt/grooved, in good condition
Weight limitations: Single wheel: 100000 lbs
Double wheel: 185000 lbs
Double tandem: 350000 lbs
Runway edge lights: high intensity

	RUNWAY 4L	**RUNWAY 22R**
Latitude:	41-58.89932N	41-59.85223N
Longitude:	087-54.83505W	087-53.78227W
Elevation:	655.7 ft.	647.7 ft.
Traffic pattern:	left	left
Runway heading:	039	219
Markings:	precision, in good condition	precision, in good condition
Visual slope indicator:		4-light PAPI on left (3.00 degrees glide path)
Approach lights:		MALSR: 1,400 foot medium intensity approach lighting system with runway alignment indicator lights
Runway end identifier lights:	no	no
Centerline lights:	yes	yes
Touchdown point:	yes, no lights	yes, lighted
Instrument approach:	LOCALIZER	ILS
Obstructions:	29 ft. lt std, 1244 ft. from runway, 411 ft. left of centerline, 36:1 slope to clear	50 ft. tree, 2019 ft. from runway, 732 ft. right of centerline, 36:1 slope to clear

Helipad H1

Dimensions: 200 x 100 ft. / 61 x 30 m
Surface: concrete
Runway edge lights: PERI
Traffic pattern: left left
Markings: basic, in good condition

Airport Operational Statistics

Runway heading:	140	320
Markings:	precision, in good condition	precision, in good condition
Visual slope indicator:	4-light PAPI on left (3.00 degrees glide path)	
RVR equipment:	touchdown, midfield, rollout	touchdown, midfield, rollout
Approach lights:	ALSF2: standard 2,400 foot high intensity approach lighting system with centerline sequenced flashers (category II or III)	MALSR: 1,400 foot medium intensity approach lighting system with runway alignment indicator lights
Runway end identifier lights:	no	no
Centerline lights:	yes	yes
Touchdown point:	yes, lighted	yes, lighted
Instrument approach:	ILS/DME	ILS
Obstructions:	42 ft. pole, 1736 ft. from runway, 772 ft. right of centerline, 36:1 slope to clear	33 ft. sign, 1277 ft. from runway, 694 ft. left of centerline, 32:1 slope to clear

Runway 4R/22L

Dimensions:	8075 x 150 ft. / 2461 x 46 m	
Surface:	asphalt/grooved, in good condition	
Weight limitations:	Single wheel: 100000 lbs Double wheel: 200000 lbs Double tandem: 350000 lbs	
Runway edge lights:	high intensity	
	RUNWAY 4R	**RUNWAY 22L**
Latitude:	41-57.19965N	41-58.19530N
Longitude:	087-53.96510W	087-52.78458W
Elevation:	661.2 ft.	654.2 ft.
Traffic pattern:	left	left
Runway heading:	042	222
Markings:	precision, in good condition	precision, in good condition
Approach lights:	MALSR: 1,400 foot medium intensity approach lighting system with runway alignment indicator lights	MALSR: 1,400 foot medium intensity approach lighting system with runway alignment indicator lights
Runway end identifier lights:	no	no
Centerline lights:	yes	yes
Touchdown point:	yes, lighted	yes, lighted
Instrument approach:	ILS	ILS
Obstructions:	none	109 ft. ant, 5424 ft. from runway, 545 ft. left of centerline, 47:1 slope to clear

Runway 9L/27R

Dimensions:	7967 x 150 ft. / 2428 x 46 m	
Surface:	asphalt/concrete/grooved, in good condition	
Weight limitations:	Single wheel: 100000 lbs Double wheel: 210000 lbs Double tandem: 350000 lbs	
Runway edge lights:	high intensity	
	RUNWAY 9L	**RUNWAY 27R**
Latitude:	41-59.03385N	41-59.03403N
Longitude:	087-55.10110W	087-53.34307W
Elevation:	659.7 ft.	650.0 ft.

Aircraft operations: avg 2526/day
68% commercial
30% air taxi
3% transient general aviation
<1% military

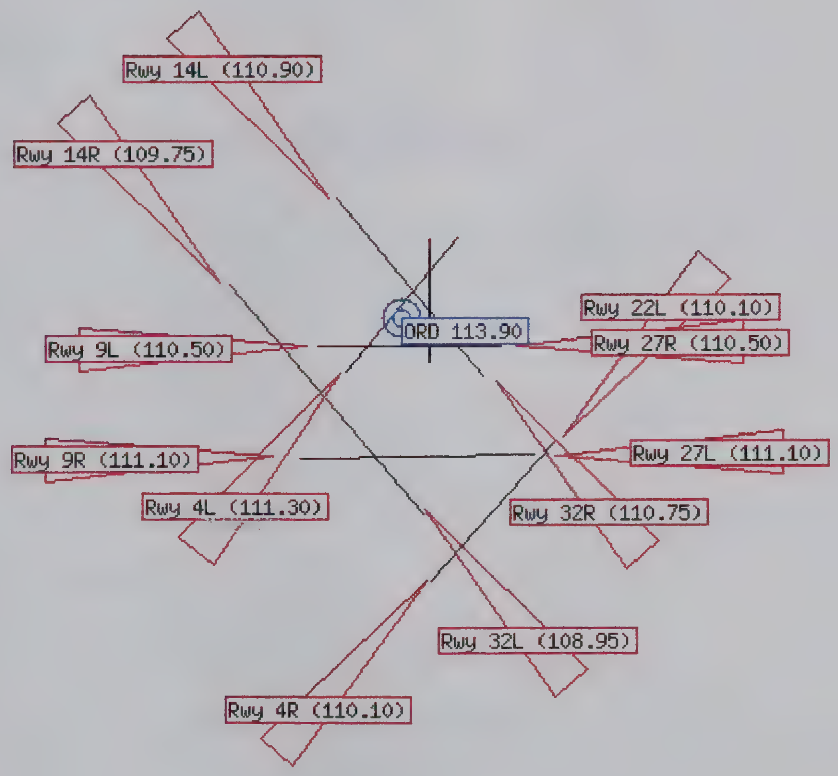
Additional Remarks

- ARPT NIGHTTIME NOISE ABATEMENT PROCEDURES ARE IN EFFECT FM 2200 TO 0700; CONTACT AMGR ON 773-686-2200.
- MAGNETIC DEVIATION POSSIBLE IMMEDIATELY WEST OF TWY M7 & RY 22L APCH ON TWY M.
- PAEW NEAR VARIOUS TWYS.
- PERIODIC FIRE DEPT TRNG AT N SECTOR OF THE ARPT.
- BIRDS ON & INVOF ARPT. PYROTECHNICS & BIRD CANNONS IN USE FOR BIRD CONTROL.
- PRIM RUN-UP LOCATION GROUND RUN UP ENCLOSURE; SECONDARY RUN UP LOCATIONS AVBL UPON REQ CONTACT CITY OPNS 773-686-2255.
- TAXI INTO POSITION & HOLD WAIVER IN EFFECT AFTER DARK AT THE FLWG INTXNS; RY 32L AT TWYS 'T-10' AND TWY 'M', RY 27L AT TWY 'M-6', RY 14L AT TWYS 'U' & 'V' & RY 32R AT TWY 'V'. THESE RYS WILL BE USED FOR DEPS ONLY WHEN EXERCISING THE PROVISIONS OF THIS WAIVER.
- ORD ATCT HAS A WAIVER AUZG IT TO CONDUCT SIMULTANEOUS OPPOSITE DIRECTION DEPS ON RYS 09L & 27L DURING IFR WEATHER CONDS.
- ALL PART 91 & UNSKED PART 125, 133 & 135 CHARTER OPERATORS CTC SIGNATURE FLIGHT SUPPORT AT 773-686-7000 REQARDING NEW SECURITY REGULATIONS PRIOR TO DEP.
- RY H1 APCH DEP PATHS ARE E & W.
- 747-400'S CANNOT PASS ON TWYS 'A' & 'B' INSUFFICIENT WINGTIP CLNC.
- FBO LCTD ON NE RAMP N OF 27R APCH.
- BE ALERT: THAT PORTION OF TWY 'Y' BTN TWY 'T' & THE UNITED AIRLINES HANGAR IS NOT VSBL FROM ATCT.
- GENERAL AVIATION RAMP LOCATED AT THE NORTH EAST RAMP
- BE ALERT: WAIVERED AIR TRAFFIC SEPERATION STANDARDS IN EFFECT FOR TRAFFIC LANDING RY 14R & DEPARTING RY 27L, WHEREBY LANDING TFC ON RY 14R WILL BE PAST THE LANDING THLD AS RY 27L DEPARTURES PASS THROUGH THE INTERSECTION OF THE TWO RYS.
- BE ALERT: TWY 'K1' OUTBOUND OR EASTBOUND ONLY, TWY 'K2' IN BOUND OR WESTBOUND ONLY & TWY 'Q' NORTHBOUND ONLY EXITING RY.
- ACFT WITH WINGSPAN 170 FT; OTHER THAN B-747 RQR 48 HRS PPR - CALL 773-686-2255.
- SEE LAND AND HOLD SHORT OPERATIONS SECTION.
- DURING PERIODS OF COLD WEATHER; THE APPEND OF RY 32R MAY NOT BE VISIBLE FM THE ATCT DUE TO STEAM PLUME FM ARPT HEATING PLANT.
- BE AWARE OF DUPLICATE ALPHA-NUMERIC TWY DESIGNATORS & TERMINAL GATE DESIGNATIONS INVOLVING THE LETTERS HK L & M.

Chicago-O'Hare Intl
KORD

ATIS 135.4 MHz
Mag dev 0.1 Degrees
Altitude 666 ft. (203 meters)
Longitude W 87.90418243
Latitude N 41.97958755

Runway	Approach	ILS	Length	Width	Surface
14L	140	110.90	10003	150	Asphalt
14R	140	109.75	13000	200	Asphalt
18	180		5341	150	Asphalt
22L	221	110.10	8071	150	Asphalt
22R	219		7500	150	Asphalt
27L	269	111.10	10141	150	Asphalt
27R	270	110.50	7967	150	Asphalt
32L	320	108.95	13000	200	Asphalt
32R	320	110.75	10003	150	Asphalt
36	360		5341	150	Asphalt
4L	39	111.30	7500	150	Asphalt
4R	41	110.10	8071	150	Asphalt
9L	90	110.50	7967	150	Asphalt
9R	89	111.10	10141	150	Asphalt



KORD Chicago O'Hare International Airport
Chicago, Illinois, USA

GOING TO CHICAGO?	Book a Flight	Rent a Car	Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
   Lat/Long: 41-58-46.542N / 087-54-16.071W
             41-58.77570N / 087-54.26785W
             41.9795950 / -87.9044642
             (estimated)
  Elevation: 668 ft. / 203.6 m (surveyed)
  Variation: 00E (1980)
  From city: 14 miles NW of CHICAGO, IL
```

Airport Operations

```
     Facility use: Open to the public
   Sectional chart: CHICAGO CLICK TO BUY IT NOW
    Control tower: yes
            ARTCC: CHICAGO CENTER
              FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
  NOTAMs facility: ORD (NOTAM-D service available)
       Attendance: CONTINUOUS
   Wind indicator: lighted
 Segmented circle: no
           Lights: DUSK-DAWN
           Beacon: white-green (lighted land airport)
      Landing fee: yes
  Fire and rescue: ARFF index E
 Int'l operations: customs landing rights airport
```

Airport Communications

```
            UNICOM: 122.95
              ATIS: 135.4(773-601-8921)
                    269.9
           WX ASOS: PHONE 773-462-0118
     O HARE GROUND: 121.675
                    121.75(OBND)
                    121.9(IBND)
                    348.6
      O HARE TOWER: 120.75(SOUTH)
                    126.9(NORTH)
                    127.925
                    132.7
                    390.9
  CHICAGO APPROACH: 119.0(360-179)
                    128.45(180-359)
                    284.0(180-359)
                    393.1(360-179)
                    121.15
```

	124.35
	125.7(180-359)
CHICAGO DEPARTURE:	125.0(340-159)
	125.4(220-339)
	127.4(160-219)
	269.5(160-219)
	307.2(220-339)
	337.4(340-159)
CLEARANCE DELIVERY:	121.6
	119.25
ALCP:	252.1
CLASS B:	120.55(NORTH)
	128.45(180-359)
	133.5(SOUTH)
	284.0(180-359)
	290.2(NORTH)
	371.9(SOUTH)
CLASS B IC:	119.0(360-179)
	393.1(360-179)
CLASS B/S:	134.4
EMERG:	121.5
	243.0
IC:	126.9(NORTH)
METERING:	121.675
PTC/P:	121.6
PTC/S:	119.25
VFR ADV:	126.8
WX ASOS at PWK (8 nm N):	124.20 (847-465-0291)
WX ASOS at MDW (13 nm SE):	132.75 (773-581-8094)
WX ASOS at DPA (16 nm W):	124.80 (630-584-2728)

- ASR-7 (S) LCTD LAT 41-58-48.6N/LONG 087-55-40.0W.
- CLASS B FREQS 120.55/290.2 FOR VFR AIRCRAFT REQUESTING TRAFFIC ADVISORIES OR TO TRANSITION CLASS B NORTH OF OHARE.
- CLASS B FREQS 133.5/371.9 FOR VFR AIRCRAFT REQUESTING TRAFFIC ADVISORIES OR TO TRANSITION CLASS B SOUTH OF OHARE.
- ASR-7 (N) UNUSBL 166-193 8-50 NM.
- IF UNABLE TO CONTACT CHICAGO APCH/DEP CTL ON 133.1; CALL 312-686-0681 TO OBTAIN IFR CLNC.

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
ORD at field	CHICAGO O'HARE VOR/DME	113.90	02E
OBKr174/14.7	NORTHBROOK VOR/DME	113.00	02W
DPAr073/20.6	DUPAGE VOR/DME	108.40	02E
CGTr330/31.9	CHICAGO HEIGHTS VORTAC	114.20	02E
JOTr033/31.9	JOLIET VORTAC	112.30	02E
ENWr180/37.2	KENOSHA VOR/DME	109.20	02W

NDB name	Hdg/Dist	Freq	Var	ID	
DEANA	083/5.5	350	00E	ME	-- .
DEKALB	088/35.9	209	02W	DKB	-.. -.- -...

KPWK Palwaukee Municipal Airport
Chicago/Prospect Heights/Wheeling, Illinois, USA

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
  Lat/Long: 42-06-51.200N / 087-54-05.380W
            42-06.85333N / 087-54.08967W
            42.1142222 / -87.9014944
            (estimated)
 Elevation: 647 ft. / 197.2 m (surveyed)
 Variation: 02W (2000)
 From city: 18 miles NW of central business district of the associated
            city
```

Airport Operations

```
     Facility use: Open to the public
   Sectional chart: CHICAGO
    Control tower: yes
            ARTCC: CHICAGO CENTER
              FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
  NOTAMs facility: PWK (NOTAM-D service available)
       Attendance: CONTINUOUS
   Wind indicator: lighted
 Segmented circle: yes
           Lights: DUSK-DAWN
                   TO INCR INTST HIRL RY 16/34 & ACTVT ALS & REIL RY 16 &
                   REIL RY 34 - CTAF.
           Beacon: white-green (lighted land airport)
 Int'l operations: US CUSTOMS USER FEE ARPT. FOR CUSTOMS CLNC 2 HR MIN
                   ADVANCE NOTICE RQRD MON-FRI 1200-2000 & NLT 1600 FRI
                   FOR WKEND ARRS. CONTACT CUSTOMS AT 800-323-7887 X333
                   OR 708-537-1200 X333.
```


Airport Communications

```
                     CTAF: 119.9
                   UNICOM: 122.95
                     ATIS: 124.2 [0600-2000]
                  WX ASOS: 124.20 (847-465-0291)
        PALWAUKEE GROUND: 121.7 [0600-2200 MON-FRI & 0700-2200 SAT-SUN]
         PALWAUKEE TOWER: 119.9 [0600-2200 MON-FRI & 0700-2200 SAT-SUN]
       CHICAGO APPROACH: 120.55
                         125.0
      CHICAGO DEPARTURE: 120.55
                         125.0
     CLEARANCE DELIVERY: 124.7(WHEN PAL-WAUKEE ATCT CLSD)
                         124.7
 WX ASOS at ORD (8 nm S): PHONE 773-462-0118
WX ASOS at UGN (19 nm N): 132.40 (847-782-0876)
WX ASOS at DPA (20 nm SW): 124.80 (630-584-2728)
```

- CLEARANCE DELIVERY PROVIDED BY CHICAGO APCH CTL ON FREQ 124.7 WHEN PAL-WAUKEE ATCT IS CLSD.

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
OBKr163/6.8	NORTHBROOK VOR/DME	113.00	02W
ORDr359/7.6	CHICAGO O'HARE VOR/DME	113.90	02E
DPAr054/24.1	DUPAGE VOR/DME	108.40	02E
ENWr179/29.1	KENOSHA VOR/DME	109.20	02W
BUUr154/38.8	BURBUN VOR/DME	114.50	01W
JOTr027/38.8	JOLIET VORTAC	112.30	02E
HRKr188/39.1	HORLICK VOR/DME	117.70	02W
CGTr336/39.1	CHICAGO HEIGHTS VORTAC	114.20	02E

NDB name	Hdg/Dist	Freq	Var	ID	
DEANA	032/10.4	350	00E	ME	-- .
DEKALB	075/37.5	209	02W	DKB	-.. -.- -...

KRAC John H Batten Airport
Racine, Wisconsin, USA

GOING TO RACINE?	Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
   Lat/Long: 42-45-40.289N / 087-48-50.033W
             42-45.67148N / 087-48.83388W
             42.7611914 / -87.8138981
             (estimated)
  Elevation: 674 ft. / 205.4 m (surveyed)
  Variation: 02W (1995)
  From city: 2 miles NW of RACINE, WI
```

Airport Operations

```
      Facility use: Open to the public
    Sectional chart: CHICAGO CLICK TO BUY IT NOW
     Control tower: no
             ARTCC: CHICAGO CENTER
               FSS: GREEN BAY FLIGHT SERVICE STATION [1-800-WX-BRIEF]
   NOTAMs facility: RAC (NOTAM-D service available)
        Attendance: CONTINUOUS
    Wind indicator: lighted
  Segmented circle: no
            Lights: 24 HRS
                    ACTVT HIRL RY 04/22 & MIRL RY 14/32; PAPI RYS 04 & 14;
                    VASI RY 22; REIL RYS 04; 22; 14 & 32; MALSF RY 04 -
                    CTAF.
            Beacon: white-green (lighted land airport)
  Int'l operations: customs landing rights airport
```

Airport Communications

```
                        CTAF: 123.075
                      UNICOM: 123.075
                     WX ASOS: 117.70 (262-635-0959)
          MILWAUKEE APPROACH: 120.15 SOUTH
         MILWAUKEE DEPARTURE: 120.15 SOUTH
          CLEARANCE DELIVERY: 120.15
WX ASOS at ENW (11 nm SW): 127.175 (262-652-7730)
 WX ASOS at MKE (12 nm N): PHONE 414-769-7161
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
HRK at field	HORLICK VOR/DME	117.70	02W
ENWr030/11.0	KENOSHA VOR/DME	109.20	02W
BUUr080/21.9	BURBUN VOR/DME	114.50	01W
LJTr157/23.1	TIMMERMAN VOR/DME	112.50	02W

BAEr134/29.7	BADGER VORTAC	116.40	02E
OBKr013/33.0	NORTHBROOK VOR/DME	113.00	02W

NDB name	Hdg/Dist	Freq	Var	ID
PASER	039/6.0	206	00E	RA .-. .-
TEELS	134/13.4	242	02W	GM --. --
WAUKESHA	134/25.1	359	01W	UES ..- . ...
LAKE LAWN	084/34.5	404	00W	LVV .-.. ...- ...-

KRFD Greater Rockford Airport
Rockford, Illinois, USA

GOING TO ROCKFORD?	Rent a Car	Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

Lat/Long: 42-11-43.310N / 089-05-49.960W
42-11.72183N / 089-05.83267W
42.1953639 / -89.0972111
(estimated)
Elevation: 742 ft. / 226.2 m (surveyed)
Variation: 00E (1990)
From city: 4 miles S of ROCKFORD, IL

Airport Operations

Facility use: Open to the public
Sectional chart: CHICAGO
Control tower: yes
ARTCC: CHICAGO CENTER
FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
NOTAMs facility: RFD (NOTAM-D service available)
Attendance: CONTINUOUS
Wind indicator: lighted
Segmented circle: no
Lights: DUSK-DAWN
Beacon: white-green (lighted land airport)
Fire and rescue: ARFF index A
Int'l operations: customs landing rights airport
REQUEST FOR US CUSTOMS SVC ON WEEKENDS SHOULD BE
RECIEVED BY 1700 FRI.

Airport Communications

UNICOM: 122.95
ATIS: 126.7
WX ASOS: PHONE 815-399-0627
ROCKFORD GROUND: 121.9
239.0
ROCKFORD TOWER: 118.3
239.0
ROCKFORD APPROACH: 121.0(EAST)
126.0(WEST)
327.0
ROCKFORD DEPARTURE: 121.0(EAST)
126.0(WEST)
327.0
CLEARANCE DELIVERY: 119.25
AS ASGND: 124.9
EMERG: 121.5
243.0

```
   STAGE-III: 126.0(WEST)
                              327.0
               STAGE-III IC: 121.0(EAST)
WX AWOS-3 at RPJ (18 nm S): 119.675 (815-562-2955)
```

Nearby radio navigation aids

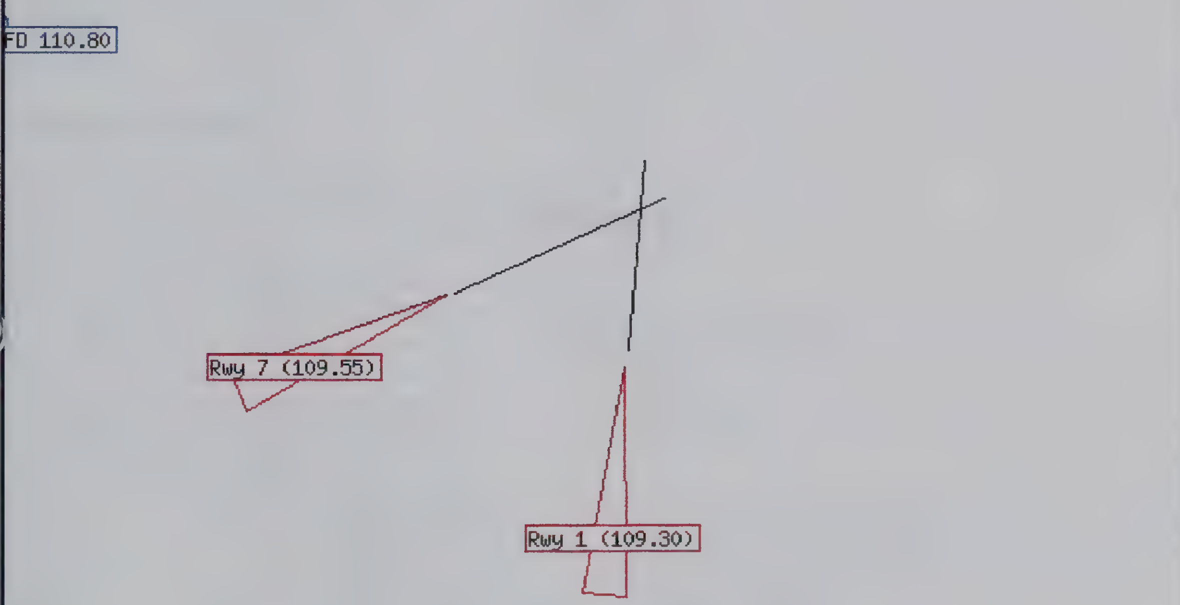
VOR radial/distance	VOR name	Freq	Var
RFDr111/4.9	ROCKFORD VOR/DME	110.80	01E
JVLr176/21.8	JANESVILLE VOR/DME	114.30	03E
PLLr051/23.5	POLO VOR/DME	111.20	03E
DPAr297/38.0	DUPAGE VOR/DME	108.40	02E

NDB name	Hdg/Dist	Freq	Var	ID	
FREEPORT	098/21.9	335	00E	FEP	..-. . .--.
DEKALB	314/23.4	209	02W	DKB	-.. -.- -...
LAKE LAWN	216/37.6	404	00W	LVV	.-.. ...- ...-

Greater Rockford
KRFD

ATIS 126.7 MHz
Mag dev -0.7 Degrees
Altitude 741 ft. (226 meters)
Longitude W 89.09721375
Latitude N 42.19536209

Runway	Approach	ILS	Length	Width	Surface
1	4	109.30	8199	150	Asphalt
19	184		8199	150	Asphalt
25	244		10000	150	Asphalt
7	64	109.55	10000	150	Asphalt



KUGN Waukegan Regional Airport
Chicago/Waukegan, Illinois, USA

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

Lat/Long: 42-25-19.776N / 087-52-04.465W
42-25.32960N / 087-52.07442W
42.4221600 / -87.8679069
(estimated)
Elevation: 727 ft. / 221.6 m (surveyed)
Variation: 01W (1985)
From city: 35 miles N of central business district of the associated city

Airport Operations

Facility use: Open to the public
Sectional chart: CHICAGO
Control tower: yes
ARTCC: CHICAGO CENTER
FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
NOTAMs facility: UGN (NOTAM-D service available)
Attendance: CONTINUOUS
Pattern altitude: 800 ft. AGL / 1527 ft. MSL
Wind indicator: lighted
Segmented circle: yes
Lights: DUSK-DAWN
WHEN ATCT CLSD MIRL RY 14/32 PRESET LOW INTST; TO INCR INTST & ACTVT HIRL RY 05/23; MALSR RY 23 & TWY LGTS - CTAF.
Beacon: white-green (lighted land airport)
Int'l operations: customs landing rights airport
US CUSTOMS USER FEE ARPT. FOR CUSTOMS CLNC 2 HRS MIN ADVN NOTICE RQRD MON-FRI DURG BUSINESS HRS & BY 4 PM FRI FOR WEEKEND ARRIVALS. CTC ARPT MGMT OFFICE 708-244-0055.

Airport Communications

CTAF: 120.05
UNICOM: 122.95
ATIS: 132.4 [0600-2000]
WX ASOS: 132.40 (847-782-0876)
WAUKEGAN GROUND: 121.65 [0600-2000]
WAUKEGAN TOWER: 120.05 [0600-2000]
380.15 [0600-2000]
CHICAGO APPROACH: 120.55
CHICAGO DEPARTURE: 120.55
WX ASOS at ENW (11 nm N): 127.175 (262-652-7730)
WX ASOS at PWK (19 nm S): 124.20 (847-465-0291)

- FREQ 122.85 AVBL ON REQ.
- ATCT OPERATED BY CONTRACT WITH ITAP (INTERNATIONAL TECHNICAL AVIATION PERSONNEL INC).
- EMERGENCY FREQUENCY NOT AVAILABLE.

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
ENWr167/11.0	KENOSHA VOR/DME	109.20	02W
OBKr019/12.6	NORTHBROOK VOR/DME	113.00	02W
HRKr189/20.5	HORLICK VOR/DME	117.70	02W
BUUr131/25.0	BURBUN VOR/DME	114.50	01W
ORDr002/26.1	CHICAGO O'HARE VOR/DME	113.90	02E
DPAr032/38.4	DUPAGE VOR/DME	108.40	02E

NDB name	Hdg/Dist	Freq	Var	ID
LAKE LAWN	117/36.1	404	00W	LVV .-.. ...- ...-

UGN - WAUKEGAN REGIONAL

CHICAGO/WAUKEGAN, IL

INSTRUMENT APPROACH TO RUNWAY 23

APPROACH AIDS INFORMATION AS PUBLISHED ON 03 OCTOBER 2002

ILS (CAT. I) RWY 23

Approach bearing

```
     Magnetic bearing: 231
         True bearing: 228
   Magnetic variation: 03W
```

Localizer information

```
                 Type: LOC
            Frequency: 110.70 MHz
  Identification code: I-UGN  .. ..- --. -.
     Antenna location: 42-24-53.136N / 087-52-38.176W
         Course width: 6.00 degrees
```

Glide slope information

```
                 Type: STANDARD GLIDE SLOPE
    Glide slope angle: 3.00 degrees
     Antenna location: 42-25-31.796N / 087-51-47.334W
                       -1150 ft. in from approach end of runway 23
Runway elevation at GS: 715.60 ft. MSL
```

Outer marker information

```
                 Type: OUTER MARKER BEACON & COMPASS LOCATOR
                 Name: WAUKE
            Frequency: 379 kHz
           Identifier: UG  ..- --.
             Location: 42-27-50.576N / 087-48-05.058W
                       3.4 nm (20640 ft.) from the approach end of runway 23
```

Middle marker information

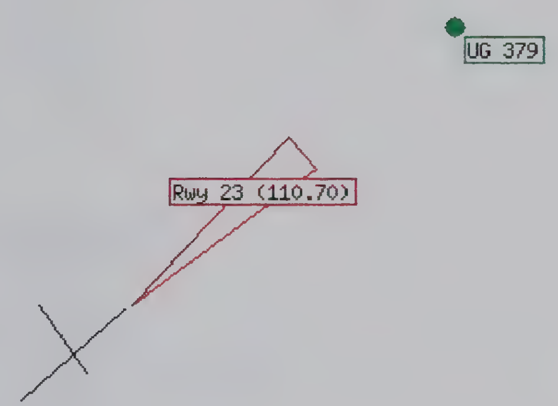
```
                 Type: MIDDLE MARKER BEACON ONLY
             Location: 42-25-54.376N / 087-51-04.863W
                       0.5 nm (2750 ft.) from the approach end of runway 23
```

No inner marker navaid

Waukegan Regl
KUGN

ATIS 132.4 MHz
Mag dev 0.1 Degrees
Altitude 725 ft. (221 meters)
Longitude W 87.86790466
Latitude N 42.42215729

Runway	Approach	ILS	Length	Width	Surface
14	144		3751	75	Asphalt
23	228	110.70	6000	150	Asphalt
32	324		3751	75	Asphalt
5	48		6000	150	Asphalt



1C5 Clow International Airport
Bolingbrook, Illinois, USA

GOING TO BOLINGBROOK?	Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
    Lat/Long: 41-41-45.508N / 088-07-45.230W
              41-41.75847N / 088-07.75383W
              41.6959744 / -88.1292306
              (estimated)
  Elevation: 670 ft. / 204 m (estimated)
  Variation: 01W (1985)
  From city:
```

Airport Operations

```
      Facility use: Open to the public
   Sectional chart: CHICAGO
     Control tower: no
             ARTCC: CHICAGO CENTER
               FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
   NOTAMs facility: IKK (NOTAM-D service available)
        Attendance: 0700-1800
  Pattern altitude: 600 ft. AGL / 1270 ft. MSL
    Wind indicator: yes
  Segmented circle: no
            Lights: DUSK-DAWN
            Beacon: white-green (lighted land airport)
```

Airport Communications

```
                        CTAF: 122.9
            CHICAGO APPROACH: 119.35
           CHICAGO DEPARTURE: 119.35
                          IC: 119.35
  WX AWOS-3 at LOT (5 nm S): 118.525 (815-588-4802)
 WX AWOS-3 at JOT (11 nm S): 119.975 (815-730-9560)
  WX ASOS at DPA (14 nm NW): 124.80 (630-584-2728)
   WX ASOS at ARR (16 nm W): 125.85 (630-466-4024)
   WX ASOS at MDW (18 nm E): 132.75 (773-581-8094)
  WX ASOS at ORD (20 nm NE): PHONE 773-462-0118
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
JOTr041/12.4	JOLIET VORTAC	112.30	02E
DPAr138/15.3	DUPAGE VOR/DME	108.40	02E
ORDr208/20.2	CHICAGO O'HARE VOR/DME	113.90	02E
CGTr292/27.4	CHICAGO HEIGHTS VORTAC	114.20	02E
EONr327/29.8	PEOTONE VORTAC	113.20	02E
OBKr196/32.5	NORTHBROOK VOR/DME	113.00	02W

IKKr341/39.4 KANKAKEE VOR/DME 111.60 00E

NDB name	Hdg/Dist	Freq	Var	ID	
ERMIN	265/13.2	332	01W	HK	.... -.-
DEKALB	121/29.5	209	02W	DKB	-.. -.- -...
OTTAWA	057/38.2	266	01E	OIX	--- .. -..-

4H1 Schaumburg Municipal Helistop
Chicago/Schaumburg, Illinois, USA

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
  Lat/Long: 42-02-53.098N / 088-03-09.259W
            42-02.88497N / 088-03.15432W
            42.0480828 / -88.0525719
            (estimated)
 Elevation: 730 ft. / 222.5 m (surveyed)
 Variation: 01W (1985)
 From city: 24 miles NW of central business district of the associated
            city
```

Heliport Operations

```
    Facility use: Open to the public
 Activation date: 02/1990
  Sectional chart: CHICAGO
   Control tower: no
           ARTCC: CHICAGO CENTER
             FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
 NOTAMs facility: IKK (NOTAM-D service available)
      Attendance: UNATNDD
  Wind indicator: lighted
Segmented circle: no
          Lights: SS-2200
          Beacon: unknown
```


Heliport Communications

```
                    CTAF: 123.05
                  UNICOM: 123.05
 WX ASOS at ORD (8 nm SE): PHONE 773-462-0118
 WX ASOS at PWK (8 nm NE): 124.20 (847-465-0291)
WX ASOS at DPA (12 nm SW): 124.80 (630-584-2728)
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
ORDr297/7.5	CHICAGO O'HARE VOR/DME	113.90	02E
OBKr205/11.3	NORTHBROOK VOR/DME	113.00	02W
DPAr053/16.3	DUPAGE VOR/DME	108.40	02E
JOTr020/32.4	JOLIET VORTAC	112.30	02E
ENWr191/33.5	KENOSHA VOR/DME	109.20	02W
CGTr324/38.8	CHICAGO HEIGHTS VORTAC	114.20	02E

NDB name	Hdg/Dist	Freq	Var	ID
DEANA	346/5.0	350	00E	ME -- .

DEKALB

079/30.0 209 02W DKB -.. -.- -...

C18 Frankfort Airport
Frankfort, Illinois, USA

GOING TO FRANKFORT?	Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
    Lat/Long: 41-28-39.000N / 087-50-25.700W
              41-28.65000N / 087-50.42833W
              41.4775000 / -87.8404722
              (estimated)
  Elevation: 778 ft. / 237.1 m (surveyed)
  Variation: 01W (1985)
  From city: 1 mile SE of FRANKFORT, IL
```

Airport Operations

```
      Facility use: Open to the public
   Sectional chart: CHICAGO CLICK TO BUY IT NOW
     Control tower: no
             ARTCC: CHICAGO CENTER
               FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
   NOTAMs facility: DPA (NOTAM-D service available)
        Attendance: 0800-1630
  Pattern altitude: 600 ft. AGL / 1378 ft. MSL
    Wind indicator: yes
  Segmented circle: no
            Lights: DUSK-DAWN
            Beacon: unknown
       Landing fee: yes
```

Airport Communications

```
                        CTAF: 122.8
                      UNICOM: 122.8
            CHICAGO APPROACH: 133.1
           CHICAGO DEPARTURE: 133.1
WX AWOS-3 at LOT (14 nm NW): 118.525 (815-588-4802)
 WX AWOS-3 at IGQ (14 nm E): 119.275 (708-895-9526) [VSBY UNRELBL]
 WX AWOS-3 at JOT (15 nm W): 119.975 (815-730-9560)
   WX ASOS at MDW (19 nm N): 132.75 (773-581-8094)
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
CGTr259/12.2	CHICAGO HEIGHTS VORTAC	114.20	02E
EONr348/12.7	PEOTONE VORTAC	113.20	02E
JOTr099/21.9	JOLIET VORTAC	112.30	02E
IKKr001/24.2	KANKAKEE VOR/DME	111.60	00E
ORDr173/30.7	CHICAGO O'HARE VOR/DME	113.90	02E
DPAr135/33.7	DUPAGE VOR/DME	108.40	02E

C56 Sanger Airport
Monee, Illinois, USA

GOING TO MONEE?	Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
    Lat/Long: 41-22-39.222N / 087-40-52.951W
              41-22.65370N / 087-40.88252W
              41.3775617 / -87.6813753
              (estimated)
  Elevation: 790 ft. / 240.8 m (surveyed)
  Variation: 01W (1985)
  From city: 3 miles SE of MONEE, IL
```

Airport Operations

```
      Facility use: Open to the public
    Sectional chart: CHICAGO  CLICK TO BUY IT NOW
      Control tower: no
              ARTCC: CHICAGO CENTER
                FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
    NOTAMs facility: IKK (NOTAM-D service available)
         Attendance: DAWN-DUSK
  Pattern altitude: 600 ft. AGL / 1390 ft. MSL
    Wind indicator: yes
  Segmented circle: no
             Lights: PHONE REQ
                     ROTG BCN PPR ONLY; CALL 708-534-8282.LIRL RYS 05/23 &
                     09/27 PPR ONLY; CALL 708-534-8282.
             Beacon: white-green (lighted land airport)
```

Airport Communications

```
                           CTAF: 123.0
                         UNICOM: 123.0
WX AWOS-3 at IGQ (12 nm NE): 119.275 (708-895-9526) [VSBY UNRELBL]
WX AWOS-3 at GYY (19 nm NE): PHONE 219-944-0010
 WX AWOS-3 at IKK (20 nm S): 111.60 (815-939-4044)
```

- APCH/DEP SERVICE PROVIDED BY CHICAGO ARTCC ON FREQS 132.5/258.1 (KANKAKEE RCAG).

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
EONr035/8.1	PEOTONE VORTAC	113.20	02E
CGTr210/9.4	CHICAGO HEIGHTS VORTAC	114.20	02E
IKKr023/19.7	KANKAKEE VOR/DME	111.60	00E
JOTr107/30.4	JOLIET VORTAC	112.30	02E
ORDr163/38.0	CHICAGO O'HARE VOR/DME	113.90	02E

C81 Campbell Airport
Grayslake, Illinois, USA

GOING TO GRAYSLAKE?	Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
   Lat/Long: 42-19-28.600N / 088-04-26.717W
             42-19.47667N / 088-04.44528W
             42.3246111 / -88.0740881
             (estimated)
  Elevation: 788 ft. / 240.2 m (surveyed)
  Variation: 02W (1995)
  From city: 2 miles SW of GRAYSLAKE, IL
```

Airport Operations

```
     Facility use: Open to the public
   Sectional chart: CHICAGO
     Control tower: no
             ARTCC: CHICAGO CENTER
               FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
   NOTAMs facility: IKK (NOTAM-D service available)
        Attendance: MON-FRI 0730-1700, SAT-SUN 0730-1800
  Pattern altitude: 800 ft. AGL / 1588 ft. MSL
    Wind indicator: lighted
  Segmented circle: no
            Lights: DUSK-DAWN
            Beacon: white-green (lighted land airport)
```


Airport Communications

```
                    CTAF: 122.7
                  UNICOM: 122.7
        CHICAGO APPROACH: 120.55
       CHICAGO DEPARTURE: 120.55
WX ASOS at UGN (11 nm NE): 132.40 (847-782-0876)
WX ASOS at PWK (15 nm SE): 124.20 (847-465-0291)
 WX ASOS at ENW (18 nm N): 127.175 (262-652-7730)
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
OBKr321/8.2	NORTHBROOK VOR/DME	113.00	02W
ENWr203/17.6	KENOSHA VOR/DME	109.20	02W
ORDr338/21.6	CHICAGO O'HARE VOR/DME	113.90	02E
BUUr156/24.1	BURBUN VOR/DME	114.50	01W
HRKr206/28.6	HORLICK VOR/DME	117.70	02W
DPAr023/28.8	DUPAGE VOR/DME	108.40	02E

NDB name	Hdg/Dist	Freq	Var	ID

LAKE LAWN	134/32.1	404	00W	LVV	.-.. ...- ...-
DEKALB	052/36.6	209	02W	DKB	-.. -.- -...

06C Schaumburg Regional Airport
Chicago/Schaumburg, Illinois, USA

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
    Lat/Long: 41-59-21.627N / 088-06-04.474W
              41-59.36045N / 088-06.07457W
              41.9893408 / -88.1012428
              (estimated)
  Elevation: 801 ft. / 244 m (estimated)
  Variation: 01W (1985)
  From city: 22 miles NW of central business district of the associated
             city
```

Airport Operations

```
      Facility use: Open to the public
   Sectional chart: CHICAGO
     Control tower: no
             ARTCC: CHICAGO CENTER
               FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
    NOTAMs facility: IKK (NOTAM-D service available)
        Attendance: 0730-2000
  Pattern altitude: 800 ft. AGL / 1601 ft. MSL
    Wind indicator: lighted
  Segmented circle: no
            Lights: DUSK-DAWN
                    MIRL RY 11/29 PRESET LOW INTST; TO INCR INTST & ACTVT
                    TWY LGTS - CTAF.
            Beacon: white-green (lighted land airport)
                    ROTG BCN OTS INDEFLY.
```


Airport Communications

```
                       CTAF: 123.0
                     UNICOM: 123.0
 WX ASOS at DPA (8 nm SW): 124.80 (630-584-2728)
  WX ASOS at ORD (9 nm E): PHONE 773-462-0118
WX ASOS at PWK (12 nm NE): 124.20 (847-465-0291)
WX ASOS at MDW (20 nm SE): 132.75 (773-581-8094)
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
ORDr269/8.8	CHICAGO O'HARE VOR/DME	113.90	02E
DPAr060/12.6	DUPAGE VOR/DME	108.40	02E
OBKr208/15.4	NORTHBROOK VOR/DME	113.00	02W
JOTr018/28.3	JOLIET VORTAC	112.30	02E
CGTr318/37.3	CHICAGO HEIGHTS VORTAC	114.20	02E
ENWr194/37.4	KENOSHA VOR/DME	109.20	02W

NDB name	Hdg/Dist	Freq	Var	ID	
DEANA	291/3.6	350	00E	ME	-- .
DEKALB	085/27.2	209	02W	DKB	-.. -.- -...

89LL Norman Airport
Peotone, Illinois, USA

GOING TO PEOTONE?	Reserve a Hotel Room

FAA INFORMATION EFFECTIVE 03 OCTOBER 2002

Location

```
    Lat/Long: 41-21-30.121N / 087-43-30.153W
              41-21.50202N / 087-43.50255W
              41.3583669 / -87.7250425
              (estimated)
   Elevation: 750 ft. / 229 m (estimated)
   Variation: 01W (1985)
   From city: 3 miles NE of PEOTONE, IL
```

Airport Operations

```
      Facility use: Private use. Permission required prior to landing
    Sectional chart: CHICAGO CLICK TO BUY IT NOW
     Control tower: no
             ARTCC: CHICAGO CENTER
               FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-WX-BRIEF]
        Attendance: MAY-OCT/IREG
    Wind indicator: yes
  Segmented circle: no
            Lights:
            Beacon: unknown
```

Airport Communications

```
                         UNICOM: 122.8
WX AWOS-3 at IGQ (14 nm NE): 119.275 (708-895-9526) [VSBY UNRELBL]
 WX AWOS-3 at IKK (18 nm S): 111.60 (815-939-4044)
```

Runway Information

Runway 9/27

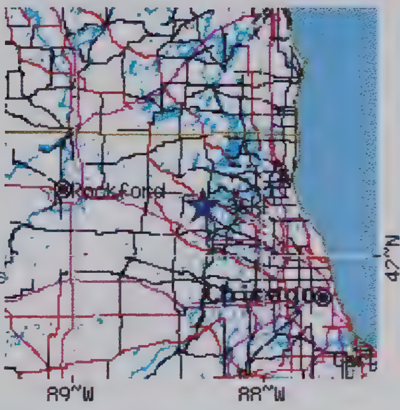
```
           Dimensions: 2500 x 100 ft. / 762 x 30 m
              Surface: turf
                       RUNWAY 9              RUNWAY 27
      Traffic pattern: left                  left
  Displaced threshold: no                    no
      Touchdown point: no                    no
         Obstructions:                       PLINE
```

3CK - LAKE IN THE HILLS AIRPORT

CHICAGO/LAKE IN THE HILLS, IL

AIRPORT INFORMATION AS PUBLISHED ON 03 OCTOBER 2002

Location




```
  Lat/Long: 42-12-24.491N / 088-19-22.945W
            42-12.40818N / 088-19.38242W
            42.2068031 / -88.3230403
            (estimated)
Elevation: 888 ft. / 270.7 m (surveyed)
Variation: 02W (2000)
From city: 38 miles NW of central business district of the ass
           city
```

Airport Operations

```
    Facility use: Open to the public
  Sectional chart: CHICAGO
```

```
   Control tower: no
          ARTCC: CHICAGO CENTER
            FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
 NOTAMs facility: IKK (NOTAM-D service available)
      Attendance: 0700-DUSK
  Wind indicator: lighted
Segmented circle: no
          Lights: SS-SR
                  ACTVT REIL RY 08 - 122.75.
          Beacon: white-green (lighted land airport)
```

Airport Communications

```
                    CTAF: 123.05
                  UNICOM: 123.05
        CHICAGO APPROACH: 120.55
       CHICAGO DEPARTURE: 120.55
WX ASOS at DPA (18 nm S): 124.80 (630-584-2728)
WX ASOS at PWK (20 nm E): 124.20 (847-465-0291)
```

Nearby radio navigation aids

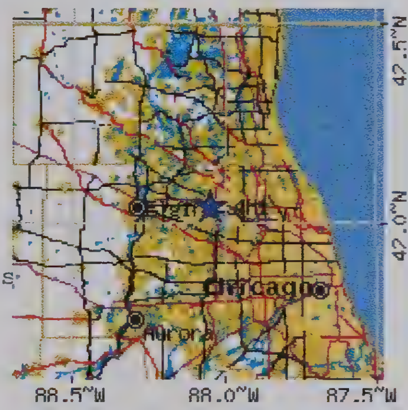
VOR radial/distance	VOR name	Freq	Var
OBKr269/16.5	NORTHBROOK VOR/DME	113.00	02W
DPAr002/19.0	DUPAGE VOR/DME	108.40	02E
ORDr303/22.8	CHICAGO O'HARE VOR/DME	113.90	02E
BUUr183/29.0	BURBUN VOR/DME	114.50	01W
ENWr218/29.2	KENOSHA VOR/DME	109.20	02W
RFDr091/39.0	ROCKFORD VOR/DME	110.80	01E

4H1 - SCHAUMBURG MUNICIPAL HELISTOP HELIPORT

CHICAGO/SCHAUMBURG, IL

HELIPORT INFORMATION AS PUBLISHED ON 03 OCTOBER 2002

Location



Lat/Long: 42-02-53.098N / 088-03-09.259W
42-02.88497N / 088-03.15432W
42.0480828 / -88.0525719
(estimated)
Elevation: 730 ft. / 222.5 m (surveyed)
Variation: 01W (1985)
From city: 24 miles NW of central business district of the ass
city

Heliport Operations

No photo available

If you have an aerial photograph of this airport that you would like to display here, please email it to airportphotos@airnav.com

Facility use: Open to the public
Activation date: 02/1990
Sectional chart: CHICAGO CLICK TO BUY IT NOW
Control tower: no
ARTCC: CHICAGO CENTER
FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
NOTAMs facility: IKK (NOTAM-D service available)
Attendance: UNATNDD
Wind indicator: lighted
Segmented circle: no
Lights: SS-2200
Beacon: unknown

Heliport Communications

CTAF: 123.05
UNICOM: 123.05
WX ASOS at ORD (8 nm SE): PHONE 773-462-0118
WX ASOS at PWK (8 nm NE): 124.20 (847-465-0291)
WX ASOS at DPA (12 nm SW): 124.80 (630-584-2728)

Nearby radio navigation aids

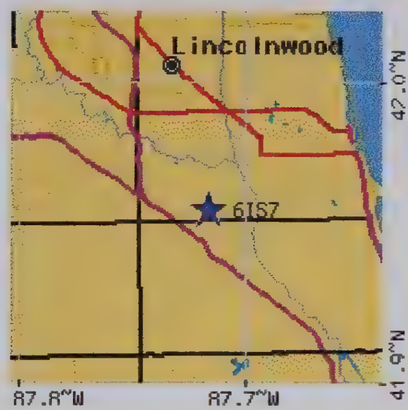
VOR radial/distance	VOR name	Freq	Var
ORDr297/7.5	CHICAGO O'HARE VOR/DME	113.90	02E
OBKr205/11.3	NORTHBROOK VOR/DME	113.00	02W
DPAr053/16.3	DUPAGE VOR/DME	108.40	02E
JOTr020/32.4	JOLIET VORTAC	112.30	02E
ENWr191/33.5	KENOSHA VOR/DME	109.20	02W
CGTr324/38.8	CHICAGO HEIGHTS VORTAC	114.20	02E

6IS7 - ST MARY OF NAZARETH HOSPITAL CENTER HELIPORT

CHICAGO, IL

HELIPO **BLISHED ON**

Location




```
   Lat/Long: 41-57-30.116N / 087-43-00.197W
             41-57.50193N / 087-43.00328W
             41.9583656 / -87.7167214
             (estimated)
 Elevation: 640 ft. / 195 m (estimated)
 Variation: 01W (1985)
 From city:
```

Heliport Operations

```
     Facility use: Private use, MEDICAL USE.
  Activation date: 06/1985
   Sectional chart: CHICAGO  CLICK TO BUY IT NOW
     Control tower: no
            ARTCC: CHICAGO CENTER
              FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
       Attendance: CONTINUOUS
    Wind indicator: yes
 Segmented circle: no
           Lights: PHONE REQ
                   FOR ARPT BCN CALL 312-770-2457.
           Beacon: white-green-yellow (heliport)
```

No photo available

If you have an aerial photograph of this airport that you would like to display here, please email it to airportphotos@airnav.com

Heliport Communications

```
  WX ASOS at ORD (8 nm W): PHONE 773-462-0118
 WX ASOS at MDW (10 nm S): 132.75 (773-581-8094)
WX ASOS at PWK (12 nm NW): 124.20 (847-465-0291)
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
ORDr100/8.6	CHICAGO O'HARE VOR/DME	113.90	02E
OBKr148/18.9	NORTHBROOK VOR/DME	113.00	02W
CGTr344/27.7	CHICAGO HEIGHTS VORTAC	114.20	02E
DPAr080/28.6	DUPAGE VOR/DME	108.40	02E
JOTr045/36.6	JOLIET VORTAC	112.30	02E
ENWr168/39.6	KENOSHA VOR/DME	109.20	02W

6IS9 - ST JOSEPH MEDICAL CENTER - JOLIET HELIPORT

JOLIET, IL

HELIPORT INFORMATION AS PUBLISHED ON 03 OCTOBER 2002

Location


```
   Lat/Long: 41-31-43.110N / 088-08-13.217W
             41-31.71850N / 088-08.22028W
             41.5286417 / -88.1370047
             (estimated)
  Elevation: 641 ft. / 195 m (estimated)
  Variation: 01W (1985)
  From city: 1 mile W of JOLIET, IL
```

Heliport Operations

```
     Facility use: Private use, MEDICAL USE.
  Activation date: 06/1985
   Sectional chart: CHICAGO  CLICK TO BUY IT NOW
    Control tower: no
            ARTCC: CHICAGO CENTER
              FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
       Attendance: CONTINUOUS
   Wind indicator: lighted
 Segmented circle: no
           Lights: 24 HRS
           Beacon: white-green-yellow (heliport)
```

No photo available

If you have an aerial photograph of this airport that you would like to display here, please email it to airportphotos@airnav.com

Heliport Communications

```
WX AWOS-3 at JOT (1.8 nm W): 119.975 (815-730-9560)
  WX AWOS-3 at LOT (5 nm N): 118.525 (815-588-4802)
WX AWOS-3 at C09 (14 nm SW): 118.175 (815-941-1815)
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
JOTr095/8.2	JOLIET VORTAC	112.30	02E
EONr313/22.0	PEOTONE VORTAC	113.20	02E
DPAr154/23.7	DUPAGE VOR/DME	108.40	02E
CGTr271/25.4	CHICAGO HEIGHTS VORTAC	114.20	02E
ORDr199/29.4	CHICAGO O'HARE VOR/DME	113.90	02E
IKKr335/30.2	KANKAKEE VOR/DME	111.60	00E

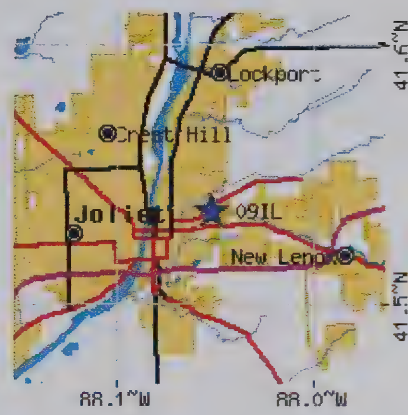
NDB name	Hdg/Dist	Freq	Var	ID
OTTAWA	072/33.8	266	01E	OIX --- .. -..-

09IL - SILVER CROSS HOSPITAL HELIPORT

JOLIET, IL

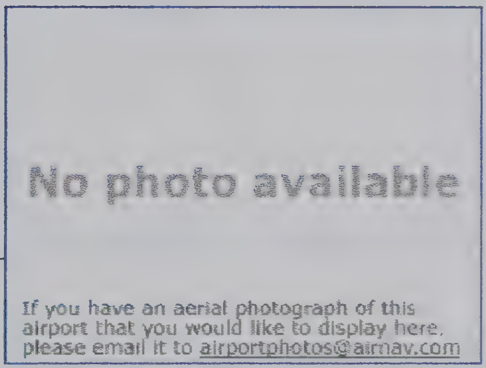
HELIPORT INFORMATION AS PUBLISHED ON 03 OCTOBER 2002

Location




```
   Lat/Long: 41-32-11.111N / 088-03-09.207W
             41-32.18518N / 088-03.15345W
             41.5364197 / -88.0525575
             (estimated)
 Elevation: 610 ft. / 186 m (estimated)
 Variation: 01W (1985)
 From city: 2 miles NE of JOLIET, IL
```

Heliport Operations




```
     Facility use: Private use, MEDICAL USE.
  Sectional chart: CHICAGO  CLICK TO BUY IT NOW
    Control tower: no
            ARTCC: CHICAGO CENTER
              FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
       Attendance: CONTINUOUS
   Wind indicator: yes
 Segmented circle: no
           Lights:
           Beacon: unknown
```

Heliport Communications

```
WX AWOS-3 at LOT (5 nm NW): 118.525 (815-588-4802)
 WX AWOS-3 at JOT (6 nm W): 119.975 (815-730-9560)
WX AWOS-3 at C09 (18 nm W): 118.175 (815-941-1815)
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
JOTr091/12.0	JOLIET VORTAC	112.30	02E
EONr322/19.9	PEOTONE VORTAC	113.20	02E
CGTr272/21.7	CHICAGO HEIGHTS VORTAC	114.20	02E
DPAr146/25.1	DUPAGE VOR/DME	108.40	02E
ORDr192/27.9	CHICAGO O'HARE VOR/DME	113.90	02E
IKKr342/29.2	KANKAKEE VOR/DME	111.60	00E

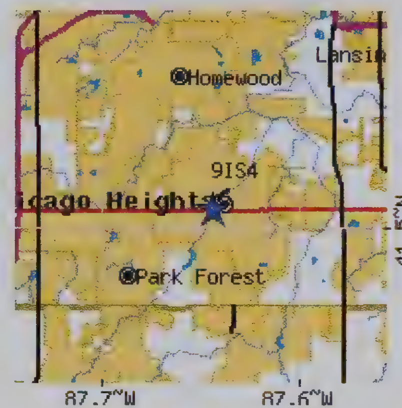
NDB name	Hdg/Dist	Freq	Var	ID	
ERMIN	223/14.6	332	01W	HK	.... -.-
OTTAWA	073/37.5	266	01E	OIX	--- .. -..-

9IS4 - ST JAMES HOSPITAL AND HEALTH CENTERS HELIPORT

CHICAGO HEIGHTS, IL

HELIPO

Location



Lat/Long: 41-30-28.000N / 087-38-40.000W
41-30.46667N / 087-38.66667W
41.5077778 / -87.6444444
(estimated)
Elevation: 694 ft. / 212 m (estimated)
Variation: 01W (1985)
From city: 1 mile NW of CHICAGO HEIGHTS, IL

No photo available

If you have an aerial photograph of this airport that you would like to display here, please email it to airportphotos@airnav.com

Heliport Operations

Facility use: Private use, MEDICAL USE.
Activation date: 09/1986
Sectional chart: CHICAGO CLICK TO BUY IT NOW
Control tower: no
ARTCC: CHICAGO CENTER
FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
Attendance: CONTINUOUS
Wind indicator: lighted
Segmented circle: no
Lights: 24 HRS
Beacon: white-green-yellow (heliport)

Heliport Communications

WX AWOS-3 at IGQ (5 nm E): 119.275 (708-895-9526) [VSBY UNRELBL
WX AWOS-3 at GYY (12 nm NE): PHONE 219-944-0010
WX ASOS at MDW (17 nm N): 132.75 (773-581-8094)

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
CGTr266/3.3	CHICAGO HEIGHTS VORTAC	114.20	02E
EONr023/15.7	PEOTONE VORTAC	113.20	02E
IKKr020/27.6	KANKAKEE VOR/DME	111.60	00E
JOTr092/30.4	JOLIET VORTAC	112.30	02E
ORDr156/31.1	CHICAGO O'HARE VOR/DME	113.90	02E
DPAr124/39.1	DUPAGE VOR/DME	108.40	02E

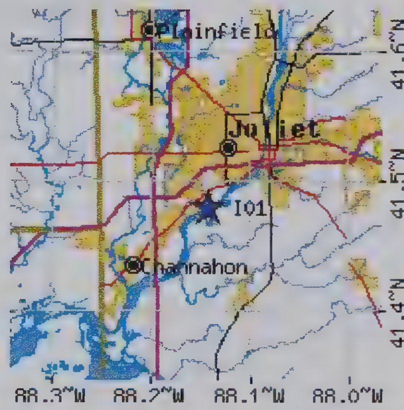
NDB name	Hdg/Dist	Freq	Var	ID

I01 - EMPRESS RIVER CASINO HELIPORT

JOLIET, IL

HELIPORT INFORMATION AS PUBLISHED ON 03 OCTOBER 2002

Location




```
   Lat/Long: 41-28-49.111N / 088-08-38.215W
             41-28.81852N / 088-08.63692W
             41.4803086 / -88.1439486
             (estimated)
  Elevation: 550 ft. / 168 m (estimated)
  Variation: 01W (1990)
  From city: 5 miles SW of JOLIET, IL
```

Heliport Operations

```
     Facility use: Open to the public
  Activation date: 11/1993
   Sectional chart: CHICAGO  CLICK TO BUY IT NOW
    Control tower: no
            ARTCC: CHICAGO CENTER
              FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
  NOTAMs facility: IKK (NOTAM-D service available)
       Attendance: CONTINUOUS
   Wind indicator: lighted
 Segmented circle: no
           Lights: DUSK-DAWN
           Beacon: unknown
```

No photo available

If you have an aerial photograph of this airport that you would like to display here, please email it to airportphotos@airnav.com

Heliport Communications

```
                          CTAF: 123.05
                        UNICOM: 123.05
WX AWOS-3 at JOT (2.7 nm NW): 119.975 (815-730-9560)
   WX AWOS-3 at LOT (8 nm N): 118.525 (815-588-4802)
  WX AWOS-3 at C09 (13 nm W): 118.175 (815-941-1815)
```

Nearby radio navigation aids

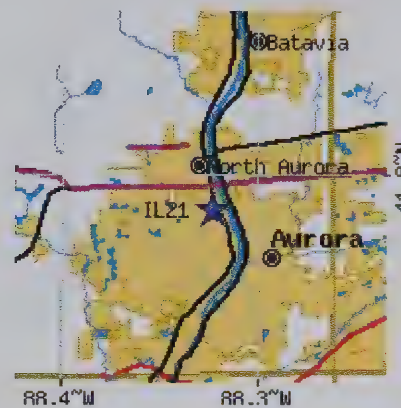
VOR radial/distance	VOR name	Freq	Var
JOTr115/8.8	JOLIET VORTAC	112.30	02E
EONr307/20.3	PEOTONE VORTAC	113.20	02E
CGTr264/25.8	CHICAGO HEIGHTS VORTAC	114.20	02E
DPAr157/26.3	DUPAGE VOR/DME	108.40	02E
IKKr331/27.7	KANKAKEE VOR/DME	111.60	00E
ORDr197/32.3	CHICAGO O'HARE VOR/DME	113.90	02E

IL21 - MERCY CENTER FOR HEALTH CARE SERVICES HELIPORT

AURORA, IL

HELIPORT INFORMATION AS PUBLISHED ON 03 OCTOBER 2002

Location




```
   Lat/Long: 41-47-12.104N / 088-19-26.260W
             41-47.20173N / 088-19.43767W
             41.7866956 / -88.3239611
             (estimated)
 Elevation: 700 ft. / 213 m (estimated)
 Variation: 01W (1985)
 From city: 1 mile NW of AURORA, IL
```

Heliport Operations

```
     Facility use: Private use, MEDICAL USE.
  Sectional chart: CHICAGO CLICK TO BUY IT NOW
    Control tower: no
            ARTCC: CHICAGO CENTER
              FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
       Attendance: CONTINUOUS
   Wind indicator: yes
 Segmented circle: no
           Lights: DUSK-DAWN
           Beacon: white-green-yellow (heliport)
```


Heliport Communications

```
    WX ASOS at ARR (7 nm W): 125.85 (630-466-4024)
   WX ASOS at DPA (8 nm NE): 124.80 (630-584-2728)
WX AWOS-3 at LOT (15 nm SE): 118.525 (815-588-4802)
 WX AWOS-3 at JOT (17 nm S): 119.975 (815-730-9560)
WX AWOS-3 at DKB (19 nm NW): 119.075 (815-748-2350)
```

Nearby radio navigation aids

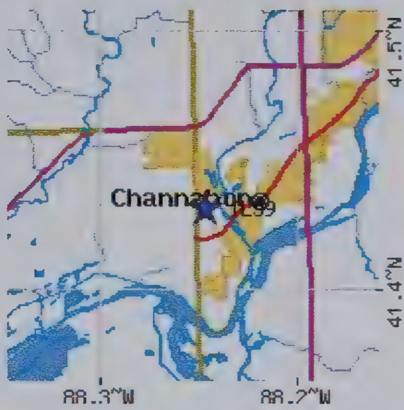
VOR radial/distance	VOR name	Freq	Var
DPAr167/6.3	DUPAGE VOR/DME	108.40	02E
JOTr357/14.4	JOLIET VORTAC	112.30	02E
ORDr235/22.3	CHICAGO O'HARE VOR/DME	113.90	02E
OBKr214/30.9	NORTHBROOK VOR/DME	113.00	02W
CGTr294/37.6	CHICAGO HEIGHTS VORTAC	114.20	02E
EONr320/39.2	PEOTONE VORTAC	113.20	02E

IL59 - CHICAGO GLIDER CLUB GLIDERPORT

CHANNAHON, IL

GLIDER[illegible]

Location



Lat/Long: 41-25-55.110N / 088-14-50.227W
41-25.91850N / 088-14.83712W
41.4319750 / -88.2472853
(estimated)
Elevation: 650 ft. / 198 m (estimated)
Variation: 00W (1985)
From city: 2 miles NW of CHANNAHON, IL

Gliderport Operations

Facility use: Private use. Permission required prior
Sectional chart: CHICAGO CLICK TO BUY IT NOW
Control tower: no
ARTCC: CHICAGO CENTER
FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
Attendance: UNATNDD
Wind indicator: yes
Segmented circle: no
Lights:
Beacon: unknown
Landing fee: yes

Gliderport Communications

WX AWOS-3 at JOT (6 nm NE): 119.975 (815-730-9560)
WX AWOS-3 at C09 (8 nm W): 118.175 (815-941-1815)
WX AWOS-3 at LOT (13 nm NE): 118.525 (815-588-4802)

- UNICOM 123.3.

Nearby radio navigation aids

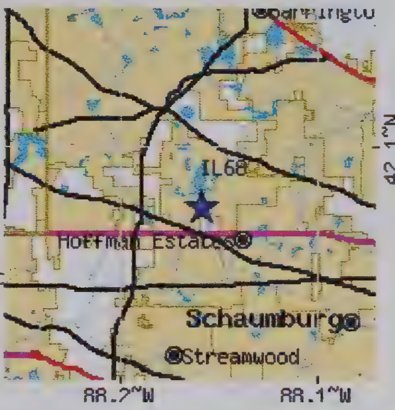
VOR radial/distance	VOR name	Freq	Var
JOTr153/7.6	JOLIET VORTAC	112.30	02E
EONr293/22.7	PEOTONE VORTAC	113.20	02E
DPAr168/27.9	DUPAGE VOR/DME	108.40	02E
IKKr320/28.0	KANKAKEE VOR/DME	111.60	00E
CGTr259/30.7	CHICAGO HEIGHTS VORTAC	114.20	02E
ORDr203/36.7	CHICAGO O'HARE VOR/DME	113.90	02E

IL68 - MILL ROSE FARM /RLA/ AIRPORT

CHICAGO/BARRINGTON, IL

AIRPOR [illegible]

Location




```
   Lat/Long: 42-04-38.094N / 088-09-35.274W
             42-04.63490N / 088-09.58790W
             42.0772483 / -88.1597983
             (estimated)
 Elevation: 850 ft. / 259 m (estimated)
 Variation: 01W (1985)
 From city: 1 mile SW of central business district of the assoc
```

Airport Operations

```
     Facility use: Private use. Permission required prior
   Sectional chart: CHICAGO CLICK TO BUY IT NOW
     Control tower: no
            ARTCC: CHICAGO CENTER
              FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
       Attendance: CONTINUOUS
    Wind indicator: yes
  Segmented circle: no
           Lights: PHONE REQ
                   FOR RWY LGTS, PHONE 708-381-5700.
           Beacon: unknown
```

Airport Communications

```
 WX ASOS at DPA (11 nm S): 124.80 (630-584-2728)
 WX ASOS at PWK (12 nm E): 124.20 (847-465-0291)
WX ASOS at ORD (13 nm SE): PHONE 773-462-0118
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
ORDr293/12.6	CHICAGO O'HARE VOR/DME	113.90	02E
OBKr229/12.7	NORTHBROOK VOR/DME	113.00	02W
DPAr035/14.1	DUPAGE VOR/DME	108.40	02E
JOTr011/32.6	JOLIET VORTAC	112.30	02E
ENWr200/32.9	KENOSHA VOR/DME	109.20	02W
BUUr171/37.3	BURBUN VOR/DME	114.50	01W

NDB name	Hdg/Dist	Freq	Var	ID
DEANA	318/8.9	350	00E	ME -- .

IL69 - FIRST AREA POLICE HDQTRS HELIPORT

CHICAGO, IL

HELIP

Location


```
   Lat/Long: 41-48-00.121N / 087-37-40.180W
             41-48.00202N / 087-37.66967W
             41.8000336 / -87.6278278
             (estimated)
 Elevation: 600 ft. / 183 m (estimated)
 Variation: 01W (1985)
 From city:
```

Heliport Operations

```
     Facility use: Private use. Permission required prior
   Sectional chart: CHICAGO CLICK TO BUY IT NOW
     Control tower: no
             ARTCC: CHICAGO CENTER
               FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
        Attendance: CONTINUOUS
    Wind indicator: yes
  Segmented circle: no
            Lights: RWY LGTS FOR OWNER'S USE ONLY.
            Beacon: unknown
```

No photo available

If you have an aerial photograph of this airport that you would like to display here, please email it to airportphotos@airnav.com

Heliport Communications

```
    WX ASOS at MDW (6 nm W): 132.75 (773-581-8094)
WX AWOS-3 at GYY (15 nm SE): PHONE 219-944-0010
 WX AWOS-3 at IGQ (16 nm S): 119.275 (708-895-9526) [VSBY UNRELBL]
  WX ASOS at ORD (16 nm NW): PHONE 773-462-0118
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
ORDr130/16.7	CHICAGO O'HARE VOR/DME	113.90	02E
CGTr350/17.6	CHICAGO HEIGHTS VORTAC	114.20	02E
OBKr152/29.1	NORTHBROOK VOR/DME	113.00	02W
EONr011/32.7	PEOTONE VORTAC	113.20	02E
DPAr098/32.7	DUPAGE VOR/DME	108.40	02E
JOTr062/34.5	JOLIET VORTAC	112.30	02E

NDB name	Hdg/Dist	Freq	Var	ID
KEDZI	039/4.5	248	01W	MX -- .-..-

AIRNAV.COM

Airports | Navaids | Airspace Fixes | Aviation Fuel

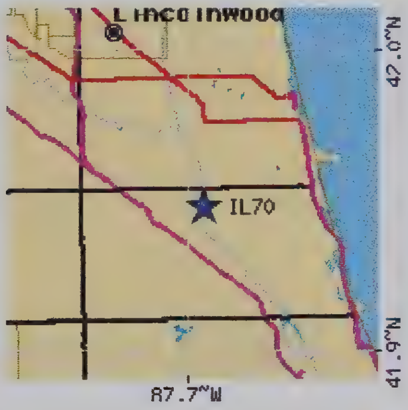
This information may not be accurate or current and is not valid for navigation, flight planning, or for use in flight. Always consult the official publications for current and correct information. Check NOTAMS before flying. No warranty of fitness for any purpose is made or implied. If you find errors in the information provided, here is [how to report them](#).

IL70 - WGN-TV HELIPORT

CHICAGO, IL

HELIPORT [illegible] OCTOBER [illegible]

Location




```
    Lat/Long: 41-56-54.000N / 087-41-36.000W
              41-56.90000N / 087-41.60000W
              41.9483333 / -87.6933333
              (estimated)
  Elevation: 591 ft. / 180 m (estimated)
  Variation: 01W (1985)
```

No photo available

If you have an aerial photograph of this airport that you would like to display here, please email it to airportphotos@airnav.com

Heliport Operations

```
   Facility use: Private use. Permission required prior
 Sectional chart: CHICAGO  CLICK TO BUY IT NOW
   Control tower: no
           ARTCC: CHICAGO CENTER
             FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
 NOTAMs facility: IKK (NOTAM-D service not available)
      Attendance: UNATNDD
                  AS SCHEDULED FOR COMPANY USE.
  Wind indicator: yes
Segmented circle: yes, SEGMENTED TRIANGLE
          Lights: DUSK-DAWN
          Beacon: unknown
```

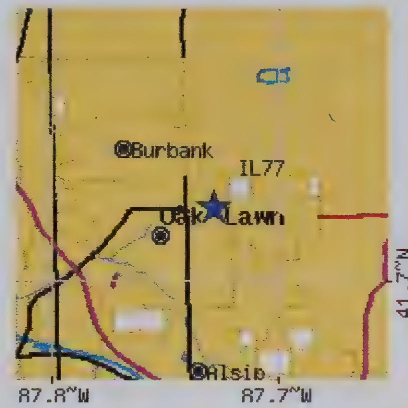
Heliport Communications

```
 WX ASOS at ORD (10 nm W): PHONE 773-462-0118
 WX ASOS at MDW (10 nm S): 132.75 (773-581-8094)
WX ASOS at PWK (14 nm NW): 124.20 (847-465-0291)
```

IL77 - ADVOCATE CHRIST MEDICAL CENTER HELIPORT

CHICAGO/OAK LAWN/, IL

HELIPORT



Location

```
   Lat/Long: 41-43-30.119N / 087-43-45.186W
             41-43.50198N / 087-43.75310W
             41.7250331 / -87.7292183
             (estimated)
 Elevation: 619 ft. / 189 m (estimated)
 Variation: 01W (1985)
 From city:
```

Heliport Operations

```
    Facility use: Private use, MEDICAL USE.
  Sectional chart: CHICAGO CLICK TO BUY IT NOW
    Control tower: no
            ARTCC: CHICAGO CENTER
              FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
       Attendance: CONTINUOUS
   Wind indicator: no
 Segmented circle: no
           Lights:
           Beacon: unknown
```

No photo available

If you have an aerial photograph of this airport that you would like to display here, please email it to airportphotos@airnav.com

Heliport Communications

```
   WX ASOS at MDW (4 nm N): 132.75 (773-581-8094)
WX AWOS-3 at IGQ (14 nm SE): 119.275 (708-895-9526) [VSBY UNRELBL]
WX AWOS-3 at GYY (16 nm SE): PHONE 219-944-0010
  WX ASOS at ORD (17 nm NW): PHONE 773-462-0118
WX AWOS-3 at LOT (18 nm SW): 118.525 (815-588-4802)
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
CGTr329/14.7	CHICAGO HEIGHTS VORTAC	114.20	02E
ORDr152/17.6	CHICAGO O'HARE VOR/DME	113.90	02E
EONr004/27.5	PEOTONE VORTAC	113.20	02E
JOTr066/28.5	JOLIET VORTAC	112.30	02E
DPAr108/29.5	DUPAGE VOR/DME	108.40	02E
OBKr164/31.4	NORTHBROOK VOR/DME	113.00	02W
IKKr008/39.4	KANKAKEE VOR/DME	111.60	00E

NDB name	Hdg/Dist	Freq	Var	ID

IS74 - CATERPILLAR AURORA HELIPORT

MONTGOMERY, IL

HELIPORT INFORMATION AS PUBLISHED ON 03 OCTOBER 2002

Location

```
   Lat/Long: 41-43-01.105N / 088-21-33.257W
             41-43.01842N / 088-21.55428W
             41.7169736 / -88.3592381
             (estimated)
  Elevation: 660 ft. / 201 m (estimated)
  Variation: 00W (1985)
  From city: 1 mile NE of MONTGOMERY, IL
```

Heliport Operations

```
     Facility use: Private use. Permission required prior
  Activation date: 08/1981
  Sectional chart: CHICAGO CLICK TO BUY IT NOW
    Control tower: no
           ARTCC: CHICAGO CENTER
             FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
      Attendance:
  Wind indicator: yes
Segmented circle: yes
          Lights:
          Beacon: unknown
```

Heliport Communications

```
   WX ASOS at ARR (6 nm NW): 125.85 (630-466-4024)
  WX ASOS at DPA (12 nm NE): 124.80 (630-584-2728)
WX AWOS-3 at LOT (14 nm SE): 118.525 (815-588-4802)
WX AWOS-3 at JOT (15 nm SE): 119.975 (815-730-9560)
 WX AWOS-3 at C09 (18 nm S): 118.175 (815-941-1815)
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
JOTr348/10.4	JOLIET VORTAC	112.30	02E
DPAr180/10.4	DUPAGE VOR/DME	108.40	02E
ORDr229/26.0	CHICAGO O'HARE VOR/DME	113.90	02E
OBKr213/35.3	NORTHBROOK VOR/DME	113.00	02W
EONr314/37.0	PEOTONE VORTAC	113.20	02E
CGTr287/37.5	CHICAGO HEIGHTS VORTAC	114.20	02E

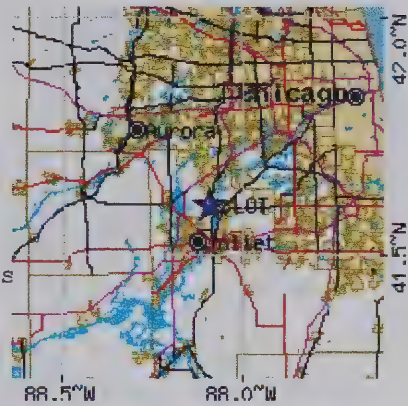
NDB name	Hdg/Dist	Freq	Var	ID

LOT - LEWIS UNIVERSITY AIRPORT

CHICAGO/ROMEOVILLE, IL

AIRPORT INFORMATION AS PUBLISHED ON 03 OCTOBER 2002

Location



Lat/Long: 41-36-30.048N / 088-05-38.553W
41-36.50080N / 088-05.64255W
41.6083467 / -88.0940425
(estimated)
Elevation: 673 ft. / 205.1 m (surveyed)
Variation: 02W (2000)
From city: 20 miles SW of central business district of the ass
city

Airport Operations

Facility use: Open to the public
Sectional chart: CHICAGO
Control tower: no
ARTCC: CHICAGO CENTER
FSS: KANKAKEE FLIGHT SERVICE STATION [1-800-
NOTAMs facility: LOT (NOTAM-D service available)
Attendance: 0700-2100
Wind indicator: lighted
Segmented circle: no
Lights: DUSK-DAWN
MIRL RY 09/27 PRESET ON LOW INTST; TO INCR INTST ACTVT
- CTAF. ACTVT REIL & PAPI RY 09 - CTAF.
Beacon: white-green (lighted land airport)

Airport Communications

CTAF: 122.8
UNICOM: 122.8
WX AWOS-3: 118.525 (815-588-4802)
CHICAGO APPROACH: 119.35
CHICAGO DEPARTURE: 119.35
IC: 119.35
WX AWOS-3 at JOT (7 nm SW): 119.975 (815-730-9560)
WX AWOS-3 at C09 (18 nm SW): 118.175 (815-941-1815)
WX ASOS at MDW (19 nm NE): 132.75 (773-581-8094)
WX ASOS at DPA (19 nm N): 124.80 (630-584-2728)
WX ASOS at ARR (20 nm NW): 125.85 (630-466-4024)

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var

VOR radial/distance	VOR name	Freq	Var
DAN at field	DANVILLE VOR	113.10	06W
SBVr253/16.7	SOUTH BOSTON VORTAC	110.40	05W

NDB name	Hdg/Dist	Freq	Var	ID	
SLAMMER	068/23.6	423	07W	SIF	... .-.
PERSON	335/24.2	220	08W	HUR	.... ..- .-.
HUNTSBORO	302/38.3	271	07W	HXO	.... -..- ---

Airport Services

Fuel available: 100LL JET-A
Parking: hangars and tiedowns
Airframe service: MINOR
Powerplant service: MINOR
Bottled oxygen: NONE
Bulk oxygen: NONE
Other services: air freight, air cargo, charter flights, flight instruction, aircraft rental, aircraft sales, aerial surveying

Runway Information

Runway 2/20

Dimensions: 6500 x 150 ft. / 1981 x 46 m
Surface: asphalt/grooved, in good condition
Weight limitations: Single wheel: 90000 lbs
Double wheel: 130000 lbs
Runway edge lights: high intensity

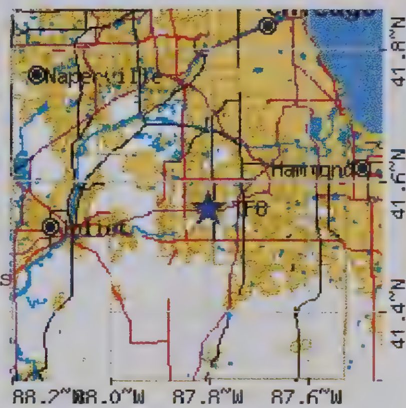
	RUNWAY 2	RUNWAY 20
Traffic pattern:	left	left
Runway heading:	022 magnetic, 016 true	202 magnetic, 196 true
Markings:	precision instrument	nonprecision instrument
Markings condition:	good	good
Latitude:	36-33.77582N	36-34.80522N
Longitude:	079-20.48878W	079-20.11587W
Elevation:	535.2 ft.	557.8 ft.
Threshold crossing height:	54 ft. AGL	50 ft. AGL
Visual glide path angle:	3.00 degrees	3.00 degrees
Declared distances:	TORA-6500; TODA-6500; ASDA-5600; LDA-5600.	TORA-6500; TODA-6500; ASDA-6500; LDA-5600.
Visual slope indicator:	4-light PAPI on left	4-light PAPI on left
Approach lights:	MALSR: 1,400 foot medium intensity approach lighting system with runway alignment indicator lights	
Runway end identifier lights:		yes
Instrument approach:	ILS	
DISPLACED THRESHOLD:	no	yes
DT distance:		900 ft.
DT latitude:		36-34.66147N
DT longitude:		079-20.16753W
DT elevation:		563.3 ft.
TOUCHDOWN POINT:	yes	yes
TD elevation:	558.0 ft.	568.0 ft.
Obstructions:		TREES

TF8 - TINLEY PARK HELISTOP HELIPORT

CHICAGO/TINLEY PARK, IL

HELIPORT INFORMATION AS PUBLISHED ON 03 OCTOBER 2002

Location




```
   Lat/Long: 41-33-33.000N / 087-48-21.000W
             41-33.55000N / 087-48.35000W
             41.5591667 / -87.8058333
             (estimated)
  Elevation: 760 ft. / 232 m (estimated)
  Variation: 02W (1995)
  From city: 20 miles SSW of central business district of the as
             city
```

Heliport Operations

```
     Facility use: Open to the public
  Activation date: 02/1999
  Sectional chart: CHICAGO CLICK TO BUY IT NOW
    Control tower: no
            ARTCC: CHICAGO CENTER
              FSS: KANKAKEE FLIGHT SERVICE STATION (on fie
                   [1-800-WX-BRIEF]
  NOTAMs facility: IKK (NOTAM-D service available)
       Attendance: 0700-2200
                   HELIPORT CLSD 2200-0700.
   Wind indicator: lighted
 Segmented circle: no
           Lights: DUSK-DAWN
           Beacon: unknown
```

No photo available

If you have an aerial photograph of this airport that you would like to display here, please email it to airportphotos@airnav.com

Heliport Communications

```
                      CTAF: 122.9
WX AWOS-3 at IGQ (12 nm E): 119.275 (708-895-9526) [VSBY UNRELBL]
WX AWOS-3 at LOT (13 nm W): 118.525 (815-588-4802)
  WX ASOS at MDW (14 nm N): 132.75 (773-581-8094)
WX AWOS-3 at JOT (17 nm W): 119.975 (815-730-9560)
WX AWOS-3 at GYY (18 nm E): PHONE 219-944-0010
```

Nearby radio navigation aids

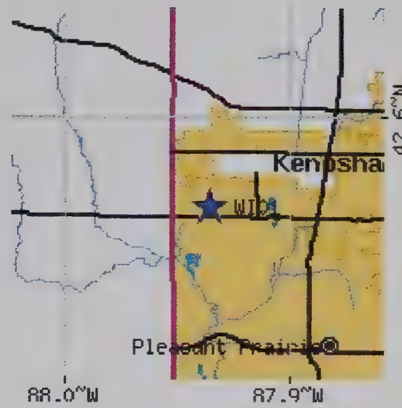
VOR radial/distance	VOR name	Freq	Var
CGTr284/10.9	CHICAGO HEIGHTS VORTAC	114.20	02E
EONr356/17.4	PEOTONE VORTAC	113.20	02E
JOTr086/23.0	JOLIET VORTAC	112.30	02E
ORDr168/26.1	CHICAGO O'HARE VOR/DME	113.90	02E

WI01 - AURORA MEDICAL CENTER KENOSHA HELIPORT

KENOSHA, WI

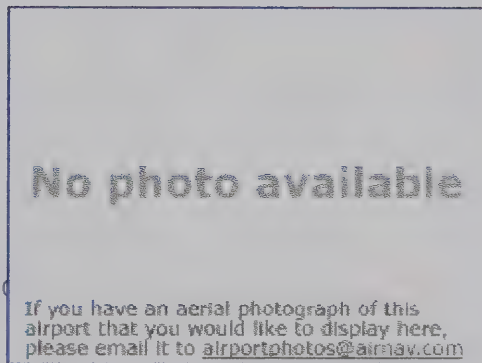
HELIPORT INFORMATION AS PUBLISHED ON 03 OCTOBER 2002

Location




```
   Lat/Long: 42-34-14.000N / 087-56-10.000W
             42-34.23333N / 087-56.16667W
             42.5705556 / -87.9361111
             (estimated)
 Elevation: 698 ft. / 213 m (estimated)
 Variation: 02W ()
 From city: 2 miles W of KENOSHA, WI
```

Heliport Operations




```
     Facility use: Private use. Permission required prior
  Activation date: 10/2000
   Sectional chart: CHICAGO  CLICK TO BUY IT NOW
     Control tower: no
            ARTCC: MINNEAPOLIS CENTER
              FSS: GREEN BAY FLIGHT SERVICE STATION [1-80
       Attendance: CONTINUOUS
 Segmented circle: no
           Lights: PHONE REQ
                   FOR PERIMETER LGTS CALL 414-942-5801.
           Beacon: unknown
```

Heliport Communications

```
  WX ASOS at ENW (1.6 nm N): 127.175 (262-652-7730)
    WX ASOS at UGN (9 nm S): 132.40 (847-782-0876)
  WX ASOS at RAC (13 nm NE): 117.70 (262-635-0959)
WX AWOS-3 at BUU (18 nm NW): 114.50 (262-757-0907)
```

Nearby radio navigation aids

VOR radial/distance	VOR name	Freq	Var
ENWr189/1.7	KENOSHA VOR/DME	109.20	02W
HRKr207/12.7	HORLICK VOR/DME	117.70	02W
BUUr115/17.6	BURBUN VOR/DME	114.50	01W
OBKr004/21.0	NORTHBROOK VOR/DME	113.00	02W
LJTr174/32.7	TIMMERMAN VOR/DME	112.50	02W
ORDr356/35.0	CHICAGO O'HARE VOR/DME	113.90	02E
BAEr153/36.2	BADGER VORTAC	116.40	02E

NDB name	Hdg/Dist	Freq	Var	ID

B

1 Marine VHF channels 1-88
2 Space Shuttle operations (HF & retransmitted shuttle audio)
3 misc local VHF info
4 NOAA weather Illinois, Wisconsin, Michigan
5 fast food VHF frequencies
6 US Disaster & expanded VOA frequencies
7 digital TV stations in operation (source: NAB)
8 National sports frequencies
9 Airline route info
10 Illinois repeater list (source: Illinois Repeater Assn)
11 Wisconsin repeater list (source: Wisconsin Assn of Repeaters)
12 MABAS system info
13 Railroad VHF info
14 Michigan repeater list (source: Michigan Area Repeater Council)
15 Michigan repeater list 144,227 & 50 mhz
16 Bus service VHF
17 FM BC radio Chicago area (source: Elliot BC Services)
18 FM BC radio list (source: FCC consolidated database)
19 local public service VHF (based on FCC data)
20 Federal/Non-Federal interoperability frequencies
21 General Aviation frequencies list
22 Digital waveguide article
23 Antenna book software readme file
24 Shortwave station schedules & info
25 Railroad VHF info (FCC database)
26 Chicage Area Railroad FCC station authorizations
27 Pennsylvania STATE POLICE FREQUENCIES
28 Combat Air Patrol over Select US Cities
29 Blue Angels & thunderbirds
30
31

MARINE FREQUENCIES

CHANNEL	FREQUENCY SHIP (tx)	IF ANY COAST (rx)	TYPE OF TRAFFIC
1			
2			
3			
4			
5			
6	156.300		intership safety
7	156.350		commercial
8	156.400		commercial
9	156.450		commercial
10	156.500		commercial
11	156.550		commercial
12	156.600		port operations/uscg
13	156.650		navigational
14	156.700		port operations/uscg
15	156.750		environ/hydrographic (ship receive)
16	156.800		DISTRESS/CALLING
17	156.850		state control
18	156.900		commercial
19	156.950		commercial
20	157.000	161.600	port operations
21	157.050		USCG Woods Hole, P. Town, Castle Hill, Cape Canal
22	157.100		USCG Notice to Mariners
23	157.150		USCG Portland Boothbay ME.
24	157.200	161.800	marine telephone NewBedford
25	157.250	161.850	marine telephone Gloucester
26	157.300	161.900	marine telephone Boston
27	157.350	161.950	marine telephone Boston
28	157.400	162.000	marine telephone Hyannis
65	156.275		port operations
66	156.325		port operations
67	156.375		commercial
68	156.425		non-commercial
69	156.475		non-commercial
70	156.525		non-commercial
71	156.575		non-commercial
72	156.625		non-commercial
73	156.675		port operations
74	156.725		port operations
75			
76			
77	156.875		commercial
78	156.925		non-commercial
79	156.975		commercial
80	157.025		commercial
81	157.075		Boston, Gloucester, Merrimack River,Pt Allerton
82			
83	157.175		USCG Auxillary, Long Island Sound
84	161.825	161.825	marine telephone Hyannis
85	157.275	161.875	marine telephone Nantucket
86	157.325	161.925	marine telephone Nantucket
87	157.375	161.975	marine telephone NewBedford
88	157.425		commercial

Shuttle Audio is re-tranmitted by the next Radio Amateur Stations.

WA3NAN	GSFC	147.450 28.650 21.395 14.295 7.185 3.860.0
W6VIO	JPL	224.040 21.280.0 14.282.0 7.165.0
K6MF	ARC	145.585 7.165.0 3.840.0
W5RRR	JSC	146.640 28.495.0 21.350.0 14.280.0 7.227.0 3.850.0
AK8Y	LERC	145.670 147.195
W1AW	ARRL	147.555 28.067.5 21.067.5 18.097.5 14.047.5 7.047.5 3.581.5 1.818.0
KA9SZX		146.880 (426.250 video channel)
K4GCC		146.940
WA4VME		145.170
N2LZH		147.210
NASA		20.192.0 (LSB)

— 1 VHF?

Shuttle frequency's on HF.	
Nasa Booster Operations	02.622.0 02.625.0 05.696.0 05.810.0 10.870.0
Cape Canveral Range Control	2678.0
Johnson Space Flight Center	3850.0 21370.0 28.600.0
Goddard Space Center	3860.0 21390.0 28650.0
Nasa Cape Radio	4856.0 4992.0 6886.0 9006.0 11414.0 11548.0 19640.0 20390.0 (Secondary) 23413.0
Houston Radio	5529.0 17940.0 21964.0

24 HF

This is a listing of many frequencies used in Northeastern Illinois sorted by frequency. It is not complete by any means.

N37

S	42.62	Illinois State Police Dist 2 dispatch (base to car)
S	42.68	Illinois State Police Dist 2 dispatch (car to base)
C	153.770	Chicago FD - Southside dispatch
L	153.890	Lake County FD Quadrant 3 dispatch
C	154.130	Chicago FD - Northside dispatch
F	154.205	Northwest Central FD dispatch (Arlington Hts, Mt Prospect et al)
F	154.250	McHenry County Fire dispatch (also Kenosha County WI)
F	154.265	NIFERN - FD Mutual Aid Dispatch frequency
F	154.355	McHenry County Fire fireground
F	154.400	Lake County FD Quadrant 4 dispatch
F	154.430	Lake County FD Quadrant 2 dispatch
S	154.695	Illinois State Police Dist 2 high band
A	155.025	ESDA
S	155.055	IREACH - Areawide police 911 dispatch
M	155.280	MERCI 280 - Hospital to hospital communications
M	155.340	MERCI 340 - Ambulance to hospital communications
	155.370	Point to point
M	155.400	MERCI 400 - Ambulance to hospital communications
	155.430	Cary PD dispatch (also several other towns)
S	155.475	ISPERN - Areawide police flash messages
L	155.655	Lake County SO dispatch (f2)
	155.700	Crystal Lake Regional PD dispatch (also Lake County IL f3)
L	155.700	Lake County SO dispatch (f3)
P	155.790	McHenry County SO
	155.835	Lake Zurich PD dispatch (also O'Hare Airport PD)
	155.880	Cary PW
	156.165	Crystal Lake Fire dispatch
L	156.210	Lake County SO dispatch (f1)
M	463.000	MED-1 Paramedic channel (Hospital to ambulance)
M	463.025	MED-2 Paramedic channel (Hospital to ambulance)
M	463.050	MED-3 Paramedic channel (Hospital to ambulance)
M	463.075	MED-4 Paramedic channel (Hospital to ambulance)
M	463.100	MED-5 Paramedic channel (Hospital to ambulance)
M	463.125	MED-6 Paramedic channel (Hospital to ambulance)
M	463.150	MED-7 Paramedic channel (Hospital to ambulance)
M	463.175	MED-8 Paramedic channel (Hospital to ambulance)
M	468.000	MED-1 Paramedic channel (Ambulance to hospital)
M	468.025	MED-2 Paramedic channel (Ambulance to hospital)
M	468.050	MED-3 Paramedic channel (Ambulance to hospital)
M	468.075	MED-4 Paramedic channel (Ambulance to hospital)
M	468.100	MED-5 Paramedic channel (Ambulance to hospital)
M	468.125	MED-6 Paramedic channel (Ambulance to hospital)
M	468.150	MED-7 Paramedic channel (Ambulance to hospital)
M	468.175	MED-8 Paramedic channel (Ambulance to hospital)
M	470.737	Southwest regional PD network (Lake Zurich, Wauconda et al)
	470.812	Barrington PD network

8 PAIRS 5Mhz offset

□

Chicago Area Frequencies 08/21/90

Fire Departments

153.7700 Chicago Fire Dept, Englewood (South)
154.1300 Chicago Fire Dept, Main (North)
154.1600 Evanston Fire Dept
154.3400 Lincolnwood Fire Dept
154.3400 Skokie Fire Dept
460.6000 Chicago Fire Dept, Ambulance (North)
460.6250 Chicago Fire Dept, Ambulance (South)

Police Departments

453.7750 Chicago Police Dept, Tow Trucks
460.0250 Chicago Police Dept, Zone 9, Districts 5 & 22
460.0500 Chicago Police Dept, Zone 2, Districts 19 & 23
460.0750 Chicago Police Dept, Zone 7, District 3
460.1000 Chicago Police Dept, Zone 10, Districts 10 & 11
460.1250 Chicago Police Dept, City-Wide 1; Traffic, Gang Crime
460.1500 Chicago Police Dept, Zone 4, Districts 1 & 18
460.1750 Chicago Police Dept, City-Wide 2; Detectives, SOG
460.2000 Chicago Police Dept, Zone 8, Districts 4 & 6
460.2250 Chicago Police Dept, Zone 3, Districts 13 & 14
460.2500 Chicago Police Dept, City-Wide 6
460.2750 Chicago Police Dept, City-Wide 3
460.3000 Chicago Police Dept, City-Wide 7; Command
460.3250 Chicago Police Dept, City-Wide 4; Youth, ET's
460.3500 Chicago Police Dept, City-Wide 5
460.3750 Chicago Police Dept, Zone 11, Districts 20 & 24
460.4000 Chicago Police Dept, Zone 6, Districts 7 & 8
460.4250 Chicago Police Dept, Zone 12, Districts 15 & 25
460.4500 Chicago Police Dept, Zone 13, Districts 9 & 12
460.4750 Chicago Police Dept, Zone 1, Districts 16 & 17
460.5000 Chicago Police Dept, Zone 5, Districts 2 & 21
470.5625 Evanston Police Dept
470.7875 Lincolnwood Police Dept
470.7875 Skokie Police Dept

Other City Services

453.5000 Chicago Dept of Streets & Sanitation
453.5500 Chicago Dept of Streets & Sanitation
453.6250 Chicago Dept of Streets & Sanitation (Snow Plows)
453.6500 Chicago Dept of Streets & Sanitation (Snow Plows)
453.6750 Chicago Traffic Signal Repair (?)
453.7250 Chicago Dept of Animal Control
453.8250 Chicago Dept of Human Services
453.8750 Chicago Metropolitan Sanitary District (?)
453.9250 Chicago Metropolitan Sanitary District
453.9750 Chicago Fire Alarm Repair (?)

Utilities

153.4700 Commonwealth Edison
153.5750 Commonwealth Edison
153.6950 Commonwealth Edison

Transportation

118.1000 O'Hare Tower
118.4000 O'Hare
118.7000 Midway Tower
119.0000 O'Hare
119.9000 Palwaukee Tower
120.7500 O'Hare

121.3000 Meigs Tower
121.9000 O'Hare
125.0000 O'Hare
125.2000 O'Hare
125.4000 O'Hare
125.7000 O'Hare
127.4000 O'Hare
127.6000 O'Hare
152.3000 American United Cab
152.3150 American Taxi
470.9875 Chicago Transit Authority Rail
471.0375 Chicago Transit Authority Rail
471.1125 Chicago Transit Authority Rail
857.8125 Northwest Cab

Medical

464.7750 Swedish Covenant Hospital

Miscellaneous

162.5500 KWO39 National Weather Service
464.6750 Bankers Life and Casualty Insurance Company

National Frequency Sampler

National Frequency Sampler:

Output	Input	Service	Location
29.6000	********	AMATEUR 10 METER CALLING	NATIONWIDE
52.5250	********	AMATEUR 6 METER CALLING	NATIONWIDE
122.8000	********	AIRCRAFT UNICOM CHANNEL	NATIONWIDE
122.7000	********	AIRCRAFT UNICOM CHANNEL	NATIONWIDE
122.9500	********	AIRCRAFT UNICOM CHANNEL	NATIONWIDE
123.0000	********	AIRCRAFT UNICOM CHANNEL	NATIONWIDE
121.5000	********	AIRCRAFT EMERGENCY CHANNEL	NATIONWIDE
146.6100	146.0100	AMATEUR 2 METER REPEATER	NATIONWIDE
146.6400	146.0400	AMATEUR 2 METER REPEATER	NATIONWIDE
146.6700	146.0700	AMATEUR 2 METER REPEATER	NATIONWIDE
146.7000	146.1000	AMATEUR 2 METER REPEATER	NATIONWIDE
146.7300	146.1300	AMATEUR 2 METER REPEATER	NATIONWIDE
146.7600	146.1600	AMATEUR 2 METER REPEATER	NATIONWIDE
146.7900	146.1900	AMATEUR 2 METER REPEATER	NATIONWIDE
146.8200	146.2200	AMATEUR 2 METER REPEATER	NATIONWIDE
146.8500	146.2500	AMATEUR 2 METER REPEATER	NATIONWIDE
146.8800	146.2800	AMATEUR 2 METER REPEATER	NATIONWIDE
146.9100	146.3100	AMATEUR 2 METER REPEATER	NATIONWIDE
146.9400	146.3400	AMATEUR 2 METER REPEATER	NATIONWIDE
146.9700	146.3700	AMATEUR 2 METER REPEATER	NATIONWIDE
147.0000	147.6000	AMATEUR 2 METER REPEATER	NATIONWIDE
147.0300	147.6300	AMATEUR 2 METER REPEATER	NATIONWIDE
147.0600	147.6600	AMATEUR 2 METER REPEATER	NATIONWIDE
147.0900	147.6900	AMATEUR 2 METER REPEATER	NATIONWIDE
147.1200	147.7200	AMATEUR 2 METER REPEATER	NATIONWIDE
147.1500	147.7500	AMATEUR 2 METER REPEATER	NATIONWIDE
147.1800	147.7800	AMATEUR 2 METER REPEATER	NATIONWIDE
147.2100	147.8100	AMATEUR 2 METER REPEATER	NATIONWIDE
147.2400	147.8400	AMATEUR 2 METER REPEATER	NATIONWIDE
147.2700	147.8700	AMATEUR 2 METER REPEATER	NATIONWIDE
147.3000	147.9000	AMATEUR 2 METER REPEATER	NATIONWIDE
147.3300	147.9300	AMATEUR 2 METER REPEATER	NATIONWIDE
147.3600	147.9600	AMATEUR 2 METER REPEATER	NATIONWIDE
147.3900	147.9900	AMATEUR 2 METER REPEATER	NATIONWIDE
146.5200	********	AMATEUR 2 METER CALLING	NATIONWIDE
148.1500	143.9000	CIVIL AIR PATROL	NATIONWIDE
152.2700	157.5300	TAXICAB COMPANIES	NATIONWIDE
152.2850	157.5450	TAXICAB COMPANIES	NATIONWIDE
152.3000	157.5600	TAXICAB COMPANIES	NATIONWIDE
152.3150	157.5750	TAXICAB COMPANIES	NATIONWIDE
152.3300	157.5900	TAXICAB COMPANIES	NATIONWIDE
152.3450	157.6050	TAXICAB COMPANIES	NATIONWIDE
152.3600	157.6200	TAXICAB COMPANIES	NATIONWIDE
152.3750	157.6350	TAXICAB COMPANIES	NATIONWIDE
152.3900	157.6500	TAXICAB COMPANIES	NATIONWIDE
152.4050	157.6650	TAXICAB COMPANIES	NATIONWIDE
152.4200	157.6800	TAXICAB COMPANIES	NATIONWIDE
152.4350	157.6950	TAXICAB COMPANIES	NATIONWIDE
152.4500	157.7100	TAXICAB COMPANIES	NATIONWIDE
152.4650	157.7250	TAXICAB COMPANIES	NATIONWIDE
154.0100	********	FIRE DEPARTMENTS	NATIONWIDE
154.0700	********	FIRE DEPARTMENTS	NATIONWIDE
154.1300	********	FIRE DEPARTMENTS	NATIONWIDE
154.1450	********	FIRE DEPARTMENTS	NATIONWIDE

154.1600	********	FIRE DEPARTMENTS	NATIONWIDE
154.1750	********	FIRE DEPARTMENTS	NATIONWIDE
154.1900	********	FIRE DEPARTMENTS	NATIONWIDE
154.2050	********	FIRE DEPARTMENTS	NATIONWIDE
154.2200	********	FIRE DEPARTMENTS	NATIONWIDE
154.2350	********	FIRE DEPARTMENTS	NATIONWIDE
154.2500	********	FIRE DEPARTMENTS	NATIONWIDE
154.2650	********	FIRE DEPARTMENTS	NATIONWIDE
154.2800	********	FIRE DEPARTMENTS	NATIONWIDE
154.2950	********	FIRE DEPARTMENTS	NATIONWIDE
154.3100	********	FIRE DEPARTMENTS	NATIONWIDE
154.3250	********	FIRE DEPARTMENTS	NATIONWIDE
154.3400	********	FIRE DEPARTMENTS	NATIONWIDE
154.3550	********	FIRE DEPARTMENTS	NATIONWIDE
154.3700	********	FIRE DEPARTMENTS	NATIONWIDE
154.3850	********	FIRE DEPARTMENTS	NATIONWIDE
154.4000	********	FIRE DEPARTMENTS	NATIONWIDE
154.4150	********	FIRE DEPARTMENTS	NATIONWIDE
154.4300	********	FIRE DEPARTMENTS	NATIONWIDE
154.4450	********	FIRE DEPARTMENTS	NATIONWIDE
155.1600	********	PUBLIC SAFETY SERVICES	NATIONWIDE
155.1750	********	PUBLIC SAFETY SERVICES	NATIONWIDE
155.2050	********	PUBLIC SAFETY SERVICES	NATIONWIDE
155.2200	********	PUBLIC SAFETY SERVICES	NATIONWIDE
155.2350	********	PUBLIC SAFETY SERVICES	NATIONWIDE
155.2650	********	PUBLIC SAFETY SERVICES	NATIONWIDE
155.2800	********	PUBLIC SAFETY SERVICES	NATIONWIDE
155.2950	********	PUBLIC SAFETY SERVICES	NATIONWIDE
155.3250	********	PUBLIC SAFETY SERVICES	NATIONWIDE
155.3400	********	PUBLIC SAFETY SERVICES	NATIONWIDE
155.3550	********	PUBLIC SAFETY SERVICES	NATIONWIDE
155.3700	********	POLICE DEPARTMENTS	NATIONWIDE
155.3850	********	PUBLIC SAFETY SERVICES	NATIONWIDE
155.4000	********	PUBLIC SAFETY SERVICES	NATIONWIDE
155.4750	********	POLICE DEPARTMENTS	NATIONWIDE
156.2750	********	MARINE PORT OPERATIONS	NATIONWIDE
156.3250	********	MARINE PORT OPERATIONS	NATIONWIDE
156.3500	********	MARINE COMMERCIAL OPERATIONS	NATIONWIDE
156.3750	********	MARINE COMMERCIAL OPERATIONS	NATIONWIDE
156.4000	********	MARINE COMMERCIAL OPERATIONS	NATIONWIDE
156.4500	********	MARINE COMMERCIAL OPERATIONS	NATIONWIDE
156.5000	********	MARINE COMMERCIAL OPERATIONS	NATIONWIDE
156.5500	********	MARINE COMMERCIAL OPERATIONS	NATIONWIDE
156.6000	********	MARINE PORT OPERATIONS	NATIONWIDE
156.6500	********	MARINE NAVIGATIONAL OPS.	NATIONWIDE
156.6750	********	MARINE PORT OPERATIONS	NATIONWIDE
156.7000	********	MARINE PORT OPERATIONS	NATIONWIDE
156.7250	********	MARINE PORT OPERATIONS	NATIONWIDE
156.8000	********	MARINE CALLING/EMGERGENCY	NATIONWIDE
156.8750	********	MARINE COMMERCIAL OPERATIONS	NATIONWIDE
156.9000	********	MARINE COMMERCIAL OPERATIONS	NATIONWIDE
156.9500	********	MARINE COMMERCIAL OPERATIONS	NATIONWIDE
156.9750	********	MARINE COMMERCIAL OPERATIONS	NATIONWIDE
157.0000	********	MARINE PORT OPERATIONS	NATIONWIDE
157.0250	********	MARINE COMMERCIAL OPERATIONS	NATIONWIDE
157.1000	********	COAST GUARD	NATIONWIDE
157.1250	********	COAST GUARD	NATIONWIDE
157.1500	********	COAST GUARD	NATIONWIDE
161.8000	157.2000	MARINE TELEPHONE CHANNEL	NATIONWIDE
161.8250	157.2250	MARINE TELEPHONE CHANNEL	NATIONWIDE
161.8500	157.2500	MARINE TELEPHONE CHANNEL	NATIONWIDE

161.8750	157.2750	MARINE TELEPHONE CHANNEL	NATIONWIDE
161.9000	157.3000	MARINE TELEPHONE CHANNEL	NATIONWIDE
161.9250	157.3250	MARINE TELEPHONE CHANNEL	NATIONWIDE
161.9500	157.3500	MARINE TELEPHONE CHANNEL	NATIONWIDE
161.9750	157.3750	MARINE TELEPHONE CHANNEL	NATIONWIDE
162.0000	157.4000	MARINE TELEPHONE CHANNEL	NATIONWIDE
415.2000	413.9500	FEDERAL PROTECTIVE SERVICE	NATIONWIDE
452.0500	457.0500	TAXICAB COMPANIES	NATIONWIDE
452.1000	457.1000	TAXICAB COMPANIES	NATIONWIDE
452.1500	457.1500	TAXICAB COMPANIES	NATIONWIDE
452.2000	457.2000	TAXICAB COMPANIES	NATIONWIDE
452.2250	457.2250	TAXICAB COMPANIES	NATIONWIDE
452.2500	457.2500	TAXICAB COMPANIES	NATIONWIDE
452.2750	457.2750	TAXICAB COMPANIES	NATIONWIDE
452.3000	457.3000	TAXICAB COMPANIES	NATIONWIDE
452.3500	457.3500	TAXICAB COMPANIES	NATIONWIDE
452.4000	457.4000	TAXICAB COMPANIES	NATIONWIDE
452.4500	457.4500	TAXICAB COMPANIES	NATIONWIDE
452.5000	457.5000	TAXICAB COMPANIES	NATIONWIDE
460.0250	465.0250	POLICE	NATIONWIDE
460.0500	465.0500	POLICE	NATIONWIDE
460.0750	465.0750	POLICE	NATIONWIDE
460.1000	465.1000	POLICE	NATIONWIDE
460.1250	465.1250	POLICE	NATIONWIDE
460.1500	465.1500	POLICE	NATIONWIDE
460.1750	465.1750	POLICE	NATIONWIDE
460.2000	465.2000	POLICE	NATIONWIDE
460.2250	465.2250	POLICE	NATIONWIDE
460.2500	465.2500	POLICE	NATIONWIDE
460.2750	465.2750	POLICE	NATIONWIDE
460.3000	465.3000	POLICE	NATIONWIDE
460.3250	465.3250	POLICE	NATIONWIDE
460.3500	465.3500	POLICE	NATIONWIDE
460.3750	465.3750	POLICE	NATIONWIDE
460.4000	465.4000	POLICE	NATIONWIDE
460.4250	465.4250	POLICE	NATIONWIDE
460.4500	465.4500	POLICE	NATIONWIDE
460.4750	465.4750	POLICE	NATIONWIDE
460.5000	465.5000	POLICE	NATIONWIDE
460.5250	465.525	POLICE/FIRE/SAFETY	NATIONWIDE
460.5500	465.5500	POLICE/FIRE/SAFETY	NATIONWIDE
460.5750	465.5750	FIRE	NATIONWIDE
460.6000	465.6000	FIRE	NATIONWIDE
460.6250	465.6250	FIRE	NATIONWIDE
460.6500	465.6500	AIRLINE COMPANIES AT AIRPORT	NATIONWIDE
460.6750	465.6750	AIRLINE COMPANIES AT AIRPORT	NATIONWIDE
460.7000	465.7000	AIRLINE COMPANIES AT AIRPORT	NATIONWIDE
460.7250	465.7250	AIRLINE COMPANIES AT AIRPORT	NATIONWIDE
460.7500	465.7500	AIRLINE COMPANIES AT AIRPORT	NATIONWIDE
460.7750	465.7750	AIRLINE COMPANIES AT AIRPORT	NATIONWIDE
460.8000	465.8000	AIRLINE COMPANIES AT AIRPORT	NATIONWIDE
460.8250	465.8250	AIRLINE COMPANIES AT AIRPORT	NATIONWIDE
460.8500	465.8500	AIRLINE COMPANIES AT AIRPORT	NATIONWIDE
460.8750	465.8750	AIRLINE COMPANIES AT AIRPORT	NATIONWIDE
460.9000	465.9000	SECURITY ALARM COMPANIES	NATIONWIDE
460.9250	465.9250	SECURITY ALARM COMPANIES	NATIONWIDE
460.9500	465.9500	SECURITY ALARM COMPANIES	NATIONWIDE
460.9750	465.9750	SECURITY ALARM COMPANIES	NATIONWIDE
462.9500	467.9500	PUBLIC SAFETY SERVICES	NATIONWIDE
462.9750	467.9750	PUBLIC SAFETY SERVICES	NATIONWIDE

The downloadable file (Below) will work with E-Scanner

- Download this system as a zipped ASCII file
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Put a free ad in National Communications

VHF/UHF Scanner Bands & Search Ranges With Modes & Search Steps

30-50	low band	NFM land mobile communications
	33.42-33.98@.020	fire/emergency
	37.02-37.42@.020	police
	39.02-39.98@.020	police
	42.02-42.94@.020	state police
	44.62-46.58@.020	police/state police/fire/ambulance
50-54	6 meter ham	NFM amateur radio with some repeaters
	50.00-54.00	52.525 main simplex
54-72	television	WFM TV channels 2-4
	59.75	Ch 2 audio
	65.75	Ch 3 audio
	71.75	Ch 4 audio
72-76	paging/links	NFM paging
76-88	television	WFM TV channels 5-6
	81.75	Ch 5 audio
	87.75	Ch 6 audio
88-108	FM broadcast	WFM broadcast radio
	88.1-107.9@.200 in odd steps	
108-137	aircraft band	AM aviation communications
	108-118@.100	beacons
	118-137@.025	communications
137-144	US military/ Canadian Police	NFM great opportunities near the border
144-148	2 meter ham	NFM amateur radio with many repeaters
	145.110-145.490@.020	repeaters
	146.520	main simplex
	146.610-147.390@.015 or .020	repeaters
148-174	high band	NFM land mobile/marine/weather
	153.740-154.445@.015	fire/ambulance
	154.650-156.210@.015	police/ambulance
	156.250-157.425@.025	marine
	158.730-159.210@.015	police
	161.650-161.775@.025	Canadian weather
	162.400-162.550@.025	Weather
174-216	television	TV channels 7-13
	179.75	Ch 7 audio
	185.75	Ch 8 audio
	191.75	Ch 9 audio
	197.75	Ch 10 audio
	203.75	Ch 11 audio
	209.75	Ch 12 audio
	215.75	Ch 13 audio
216-222		DIG digital land mobile
222-225	220 ham band	NFM amateur band with some repeaters
225-406	military aircraft	AM military aviation band
	406-420 federal	NFM
420-450	70 cm ham	NFM Amateur radio with many repeaters

	440.025-449.975@.025	repeaters
	446.000	main simplex
450-470	UHF band	NFM land mobile
	453.050-453.975@.025	police/fire
	460.025-460.500@.025	police
	460.525-460.625@.025	fire
	462.950-463.175@.025	ambulance
470-512	UHF T band	NFM land mobile in major metro areas great opportunity near large cities
470-806	UHF television	WFM UHF TV channels
	475.75-805.75@6.00	
806-956	800 band	NFM trunked and cellular

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NOAA

ST.	COUNTY	SAME #	NWR TRANSMITTER	FREQ.	CALL	WATTS	REMARKS
IL	Adams	017001	Hannibal MO	162.475	WXK82	1000	
IL	Alexander	017003	Marion IL	162.425	WXM49	1000	
IL	Bond	017005	--No NWR Coverage--				
IL	Boone	017007	Rockford IL	162.475	WXJ74	1000	
IL	Brown	017009	Hannibal MO	162.475	WXK82	1000	
IL	Bureau	017011	--No NWR Coverage--				
IL	Calhoun	017013	St. Louis MO	162.550	KDO89	1000	
IL	Carroll	017015	Dubuque IA	162.400	WXL64	1000	W 1/2
IL	Carroll	017015	Rockford IL	162.475	WXJ74	1000	
IL	Cass	017017	Springfield IL	162.400	WXJ75	1000	
IL	Champaign	017019	Champaign IL	162.550	WXJ76	1000	
IL	Christian	017021	Springfield IL	162.400	WXJ75	1000	
IL	Clark	017023	--No NWR Coverage--				
IL	Clay	017025	--No NWR Coverage--				
IL	Clinton	017027	--No NWR Coverage--				
IL	Coles	017029	Champaign IL	162.550	WXJ76	1000	
IL	Cook	017031	Chicago IL	162.550	KWO39	500	
IL	Crawford	017033	--No NWR Coverage--				
IL	Cumberland	017035	--No NWR Coverage--				
IL	DeKalb	017037	Rockford IL	162.475	WXJ74	1000	
IL	De Witt	017039	Springfield IL	162.400	WXJ75	1000	
IL	De Witt	017039	Champaign IL	162.550	WXJ76	1000	
IL	Douglas	017041	Champaign IL	162.550	WXJ76	1000	
IL	DuPage	017043	Chicago IL	162.550	KWO39	500	
IL	Edgar	017045	Champaign IL	162.550	WXJ76	1000	
IL	Edwards	017047	Evansville IN	162.550	KIG76	1000	
IL	Effingham	017049	--No NWR Coverage--				
IL	Fayette	017051	--No NWR Coverage--				
IL	Ford	017053	Champaign IL	162.550	WXJ76	1000	South 1/
IL	Franklin	017055	Marion IL	162.425	WXM49	1000	
IL	Fulton	017057	Peoria IL	162.475	WXJ71	1000	
IL	Gallitin	017059	Evansville IN	162.550	KIG76	1000	
IL	Greene	017061	St. Louis MO	162.550	KDO89	1000	
IL	Grundy	017063	Chicago IL	162.550	KWO39	500	
IL	Hamilton	017065	Marion IL	162.425	WXM49	1000	
IL	Hancock	017067	--No NWR Coverage--				
IL	Hardin	017069	Marion IL	162.425	WXM49	1000	
IL	Henderson	017071	--No NWR Coverage--				
IL	Henry	017073	Rock Island/Moline IL	162.550	WXJ73	1000	
IL	Iroquis	017075	--No NWR Coverage--				
IL	Jackson	017077	Marion IL	162.425	WXM49	1000	
IL	Jasper	017079	--No NWR Coverage--				
IL	Jefferson	017081	Marion IL	162.425	WXM49	1000	
IL	Jersey	017083	St. Louis MO	162.550	KDO89	1000	
IL	Jo Daviess	017085	Rockford IL	162.475	WXJ74	1000	
IL	Jo Daviess	017085	Dubuque IA	162.400	WXL64	1000	
IL	Johnson	017087	Marion IL	162.425	WXM49	1000	
IL	Kane	017089	Chicago IL	162.550	KWO39	500	
IL	Kankakee	017091	Chicago IL	162.550	KWO39	500	
IL	Kendall	017093	Chicago IL	162.550	KWO39	500	
IL	Knox	017095	Peoria IL	162.475	WXJ71	1000	
IL	Lake	017097	Chicago IL	162.550	KWO39	500	
IL	La Salle	017099	--No NWR Coverage--				
IL	Lawrence	017101	--No NWR Coverage--				
IL	Lee	017103	Rockford IL	162.475	WXJ74	1000	
IL	Livingston	017105	--No NWR Coverage--				
IL	Logan	017107	Springfield IL	162.400	WXJ75	1000	
IL	McDonough	017109	--No NWR Coverage--				
IL	McHenry	017111	Chicago IL	162.550	KWO39	500	
IL	McLean	017113	Peoria IL	162.475	WXJ71	1000	

IL	Macon	017115	Springfield IL	162.400	WXJ75	1000	
IL	Macoupin	017117	Springfield IL	162.400	WXJ75	1000	North 1/
IL	Macoupin	017117	St. Louis MO	162.550	KDO89	1000	
IL	Madison	017119	St. Louis MO	162.550	KDO89	1000	
IL	Marian	017121	--No NWR Coverage--				
IL	Marshall	017123	Peoria IL	162.475	WXJ71	1000	
IL	Mason	017125	Peoria IL	162.475	WXJ71	1000	
IL	Massac	017127	Marion IL	162.425	WXM49	1000	
IL	Menard	017129	Springfield IL	162.400	WXJ75	1000	
IL	Mercer	017131	Rock Island/Moline IL	162.550	WXJ73	1000	
IL	Monroe	017133	St. Louis MO	162.550	KDO89	1000	
IL	Montgomery	017135	Springfield IL	162.400	WXJ75	1000	North 1/
IL	Morgan	017137	Springfield IL	162.400	WXJ75	1000	
IL	Moultrie	017139	Champaign IL	162.550	WXJ76	1000	
IL	Ogle	017141	Rockford IL	162.475	WXJ74	1000	
IL	Peoria	017143	Peoria IL	162.475	WXJ71	1000	
IL	Perry	017145	Marion IL	162.425	WXM49	1000	
IL	Piatt	017147	Champaign IL	162.550	WXJ76	1000	
IL	Pike	017149	Hannibal MO	162.475	WXK82	1000	
IL	Pope	017151	Marion IL	162.425	WXM49	1000	
IL	Pulaski	017153	Marion IL	162.425	WXM49	1000	
IL	Putnan	017155	Peoria IL	162.475	WXJ71	1000	
IL	Randolph	017157	Marion IL	162.425	WXM49	1000	
IL	Randolph	017157	St. Louis MO	162.550	KDO89	1000	
IL	Richland	017159	--No NWR Coverage--				
IL	Rock Island	017161	Rock Island/Moline IL	162.550	WXJ73	1000	
IL	St. Clair	017163	St. Louis MO	162.550	KDO89	1000	
IL	Saline	017165	Marion IL	162.425	WXM49	1000	
IL	Sangamon	017167	Springfield IL	162.400	WXJ75	1000	
IL	Schuyler	017169	--No NWR Coverage--				
IL	Scott	017171	--No NWR Coverage--				
IL	Shelby	017173	--No NWR Coverage--				
IL	Stark	017175	Peoria IL	162.475	WXJ71	1000	
IL	Stephenson	017177	Rockford IL	162.475	WXJ74	1000	
IL	Tazewell	017179	Peoria IL	162.475	WXJ71	1000	
IL	Union	017181	Marion IL	162.425	WXM49	1000	
IL	Vermillion	017183	Champaign IL	162.550	WXJ76	1000	
IL	Wabash	017185	Evansville IN	162.550	KIG76	1000	
IL	Warren	017187	--No NWR Coverage--				
IL	Washington	017189	--No NWR Coverage--				
IL	Wayne	017191	--No NWR Coverage--				
IL	White	017193	Evansville IN	162.550	KIG76	1000	
IL	Whiteside	017195	Rock Island/Moline IL	162.550	WXJ73	1000	
IL	Whiteside	017195	Rockford IL	162.475	WXJ74	1000	
IL	Will	017197	Chicago IL	162.550	KWO39	500	
IL	Williamson	017199	Marion IL	162.425	WXM49	1000	
IL	Winnebago	017201	Rockford IL	162.475	WXJ74	1000	
IL	Woodford	017203	Peoria IL	162.475	WXJ71	1000	

ST.	COUNTY	SAME #	NWR TRANSMITTER	FREQ MHZ	CALL	WATTS	REMARKS
MI	Alcona	026001	Alpena MI	162.550	KIG83	500	
MI	Alger	026003	Marquette MI	162.550	KIG66	300	West 1/2
MI	Allegan	026005	Grand Rapids MI	162.550	KIG63	1000	
MI	Alpena	026007	Alpena MI	162.550	KIG83	500	
MI	Antrim	026009	Traverse City MI	162.400	KIH22	330	
MI	Arenac	026011	--No NWR Coverage--				
MI	Baraga	026013	Houghton MI	162.400	WXK73	1000	
MI	Baraga	026013	Marquette MI	162.550	KIG66	300	East 1/2
MI	Barry	026015	Grand Rapids MI	162.550	KIG63	1000	
MI	Bay	026017	Flint MI	162.475	KIH29	1000	
MI	Benzie	026019	Traverse City MI	162.400	KIH22	330	
MI	Berrien	026021	South Bend IN	162.400	WXJ57	1000	
MI	Branch	026023	Onondaga MI	162.400	WXK81	500	
MI	Calhoun	026025	Onondaga MI	162.400	WXK81	500	
MI	Cass	026027	South Bend IN	162.400	WXJ57	1000	
MI	Charlevoix	026029	Traverse City MI	162.400	KIH22	330	
MI	Cheboygen	026031	--No NWR Coverage--				
MI	Chippewa	026033	Sault Ste. Marie MI	162.550	KIG74	1000	
MI	Clare	026035	--No NWR Coverage--				
MI	Clinton	026037	Onondaga MI	162.400	WXK81	500	
MI	Crawford	026039	Gaylord MI	162.500	WWF70	100	
MI	Delta	026041	--No NWR Coverage--				
MI	Dickenson	026043	Marquette MI	162.550	KIG66	300	N 1/2
MI	Eaton	026045	Onondaga MI	162.400	WXK81	500	
MI	Emmet	026047	--No NWR Coverage--				
MI	Genesee	026049	Flint MI	162.475	KIH29	1000	
MI	Gladwin	026051	--No NWR Coverage--				
MI	Gogebic	026053	--No NWR Coverage--				
MI	Grand Traverse	026055	Traverse City MI	162.400	KIH22	330	
MI	Gratiot	026057	Onondaga MI	162.400	WXK81	500	
MI	Hillsdale	026059	Onondaga MI	162.400	WXK81	500	
MI	Houghton	026061	Houghton MI	162.400	WXK73	1000	
MI	Huron	026063	Flint MI	162.475	KIH29	1000	
MI	Ingham	026065	Onondaga MI	162.400	WXK81	500	
MI	Ionia	026067	Grand Rapids MI	162.550	KIG63	1000	
MI	Iosco	026069	--No NWR Coverage--				
MI	Iron	026071	--No NWR Coverage--				
MI	Isabella	026073	--No NWR Coverage--				
MI	Jackson	026075	Onondaga MI	162.400	WXK81	500	
MI	Kalamazoo	026077	Oshtemo MI	162.475	WWF34	500	
MI	Kalkaska	026079	Traverse City MI	162.400	KIH22	330	
MI	Kent	026081	Grand Rapids MI	162.550	KIG63	1000	
MI	Keweenaw	026083	Houghton MI	162.400	WXK73	1000	
MI	Lapeer	026087	Flint MI	162.475	KIH29	1000	
MI	Leelanau	026089	Traverse City MI	162.400	KIH22	330	
MI	Lenawee	026091	Detroit MI	162.550	KEC63	330	
MI	Livingston	026093	Detroit MI	162.550	KEC63	330	
MI	Luce	026095	--No NWR Coverage--				
MI	Mackinac	026097	Sault Ste. Marie MI	162.550	KIG74	1000	East 1/2
MI	Macomb	026099	Detroit MI	162.550	KEC63	330	
MI	Manistee	026101	Traverse City MI	162.400	KIH22	330	
MI	Marquette	026103	Marquette MI	162.550	KIG66	300	
MI	Mason	026105	--No NWR Coverage--				
MI	Mecosta	026107	--No NWR Coverage--				
MI	Menominee	026109	--No NWR Coverage--				
MI	Midland	026111	Flint MI	162.475	KIH29	1000	
MI	Missaukee	026113	Traverse City MI	162.400	KIH22	330	
MI	Monroe	026115	Detroit MI	162.550	KEC63	330	
MI	Montcalm	026117	Grand Rapids MI	162.550	KIG63	1000	
MI	Montmorency	026119	Alpena MI	162.550	KIG83	500	

MI	Muskegon	026121	Grand Rapids MI	162.550	KIG63	1000	
MI	Newaygo	026123	Hesperia MI	162.475	WWF36	150	
MI	Newaygo	026123	Grand Rapids MI	162.550	KIG63	1000	South 1/
MI	Oakland	026125	Detroit MI	162.550	KEC63	330	
MI	Oceana	026127	Hesperia MI	162.475	WWF36	150	
MI	Ogemaw	026129	--No NWR Coverage--				
MI	Ontonagon	026131	Houghton MI	162.400	WXK73	1000	
MI	Osceola	026133	--No NWR Coverage--				
MI	Oscoda	026135	Alpena MI	162.550	KIG83	500	
MI	Otsego	026137	Gaylord MI	162.500	WWF70	100	
MI	Ottawa	026139	Grand Rapids MI	162.550	KIG63	1000	
MI	Presque Isle	026141	Alpena MI	162.550	KIG83	500	
MI	Roscommon	026143	--No NWR Coverage--				
MI	Saginaw	026145	Flint MI	162.475	KIH29	1000	
MI	St. Clair	026147	Detroit MI	162.550	KEC63	330	
MI	St. Joseph	026149	South Bend IN	162.400	WXJ57	1000	
MI	St. Joseph	026149	Oshtemo MI	162.475	WWD34	500	
MI	Sanilac	026151	Flint MI	162.475	KIH29	1000	
MI	Schoolcraft	026153	--No NWR Coverage--				
MI	Shiawassee	026155	Flint MI	162.475	KIH29	1000	
MI	Tuscola	026157	Flint MI	162.475	KIH29	1000	
MI	Van Buren	026159	Oshtemo MI	162.475	WWF34	500	
MI	Washtenaw	026161	Detroit MI	162.550	KEC63	330	
MI	Wayne	026163	Detroit MI	162.550	KEC63	330	
MI	Wexford	026165	Traverse City MI	162.400	KIH22	330	

ST.	COUNTY	SAME #	NWR TRANSMITTER	FREQ MHZ	CALL	WATTS	REMARKS
WI	Adams	055001	Adams WI	162.400	WWF40	300	
WI	Ashland	055003	Park Falls WI	162.500	WXM91	500	
WI	Barron	055005	Menomonie WI	162.400	WXJ88	1000	
WI	Bayfield	055007	--No NWR Coverage--				
WI	Brown	055009	Green Bay WI	162.550	KIG65	1000	
WI	Buffalo	055011	La Crosse WI	162.550	WXJ86	1000	
WI	Buffalo	055011	Rochester MN	162.475	WXK41	1000	
WI	Burnett	055013	--No NWR Coverage--				
WI	Calumet	055015	Green Bay WI	162.550	KIG65	1000	
WI	Calumet	055015	Fond du Lac WI	162.500	WWG87	1000	
WI	Chippewa	055017	--No NWR Coverage--				
WI	Clark	055019	Wausau WI	162.475	WXJ89	100	
WI	Columbia	055021	Adams WI	162.400	WWF40	300	North 1/
WI	Columbia	055021	Madison WI	162.550	WXJ87	1000	
WI	Crawford	055023	Prairie du Chien WI	162.500	WWG86	1000	
WI	Chippewa	055023	Menomonie WI	162.400	WXJ88	1000	
WI	Dane	055025	Madison WI	162.550	WXJ87	1000	
WI	Dodge	055027	Milwaukee WI	162.400	KEC60	1000	
WI	Dodge	055027	Fond du Lac WI	162.500	WWG87	1000	
WI	Door	055029	Sister Bay WI	162.425	WXN69	500	
WI	Door	055029	Green Bay WI	162.550	KIG65	1000	
WI	Douglas	055031	Duluth MN	162.550	KIG64	1000	
WI	Dunn	055033	Menomonie WI	162.400	WXJ88	1000	
WI	Eau Claire	055035	Menomonie WI	162.400	WXJ88	1000	
WI	Florence	055037	Crandon WI	162.450	WWG88	75	
WI	Fond du Lac	055039	Milwaukee WI	162.400	KEC60	1000	
WI	Fond du Lac	055039	Fond du Lac WI	162.500	WWG87	1000	
WI	Forest	055041	Crandon WI	162.450	WWG88	75	
WI	Grant	055043	Dubuque IA	162.400	WXL64	1000	
WI	Grant	055043	Prairie du Chien WI	162.500	WWG86	1000	
WI	Green	055045	Madison WI	162.550	WXJ87	1000	
WI	Green Lake	055047	Adams WI	162.400	WWF40	300	
WI	Green Lake	055047	Fond du Lac WI	162.500	WWG87	1000	
WI	Iowa	055049	Madison WI	162.550	WXJ87	1000	
WI	Iron	055051	Park Falls WI	162.500	WXM91	500	
WI	Jackson	055053	La Crosse WI	162.550	WXJ86	1000	
WI	Jackson	055053	Adams WI	162.400	WWF40	300	East 1/2
WI	Jefferson	055055	Milwaukee WI	162.400	KEC60	1000	
WI	Juneau	055057	Adams WI	162.400	WWF40	300	
WI	Kenosha	055059	Milwaukee WI	162.400	KEC60	1000	
WI	Kewaunee	055061	Green Bay WI	162.550	KIG65	1000	
WI	La Crosse	055063	La Crosse WI	162.550	WXJ86	1000	
WI	Lafayette	055065	Dubuque IA	162.400	WXL64	1000	
WI	Lafayette	055065	Madison WI	162.550	WXJ87	1000	
WI	Langlade	055067	Wausau WI	162.475	WXJ89	100	
WI	Langlade	055067	Crandon WI	162.450	WWG88	75	
WI	Lincoln	055069	Wausau WI	162.475	WXJ89	100	
WI	Manitowoc	055071	Green Bay WI	162.550	KIG65	1000	
WI	Marathon	055073	Wausau WI	162.475	WXJ89	100	
WI	Marinette	055075	Green Bay WI	162.550	KIG65	1000	S 1/2
WI	Marinette	055075	Crandon WI	162.450	WWG88	75	
WI	Marinette	055075	Sister Bay WI	162.425	WXN69	500	
WI	Marquette	055077	Adams WI	162.400	WWF40	300	
WI	Menominee	055078	Wausau WI	162.475	WXJ89	100	West 1/2
WI	Menominee	055078	Green Bay WI	162.550	KIG65	1000	East 1/2
WI	Milwaukee	055079	Milwaukee WI	162.400	KEC60	1000	
WI	Monroe	055081	Adams WI	162.400	WWF40	300	East 1/2
WI	Oconto	055083	Green Bay WI	162.550	KIG65	1000	SE 1/2
WI	Oconto	055083	Crandon WI	162.450	WWG88	75	
WI	Oneida	055085	Park Falls WI	162.500	WXM91	500	

WI	Oneida	055085	Crandon WI	162.450	WWG88	75	
WI	Oneida	055085	Wausau WI	162.475	WXJ89	100	
WI	Outagamie	055087	Green Bay WI	162.550	KIG65	1000	
WI	Ozaukee	055089	Milwaukee WI	162.400	KEC60	1000	
WI	Pepin	055091	Menomonie WI	162.400	WXJ88	1000	
WI	Pierce	055093	Minneapolis/St. Paul MN	162.550	KEC65	1000	
WI	Pierce	055093	Menomonie WI	162.400	WXJ88	1000	
WI	Polk	055095	Menomonie WI	162.400	WXJ88	1000	
WI	Polk	055095	Minneapolis/St. Paul MN	162.550	KEC65	1000	SW
WI	Portage	055097	Wausau WI	162.475	WXJ89	100	
WI	Portage	055097	Adams WI	162.400	WWF40	300	
WI	Price	055099	Park Falls WI	162.500	WXM91	500	
WI	Racine	055101	Milwaukee WI	162.400	KEC60	1000	
WI	Richland	055103	Richland Center WI	162.450	WWG90	200	
WI	Rock	055105	Rockford IL	162.475	WXJ74	1000	South 1/
WI	Rock	055105	Madison WI	162.550	WXJ87	1000	
WI	Rock	055105	Janesville WI	162.425	WWG89	200	
WI	Rusk	055107	Menomonie WI	162.400	WXJ88	1000	
WI	St. Croix	055109	Minneapolis/St. Paul MN	162.550	KEC65	1000	
WI	St. Croix	055109	Menomonie WI	162.400	WXJ88	1000	
WI	Sauk	055111	Madison WI	162.550	WXJ87	1000	
WI	Sauk	055111	Adams WI	162.400	WWF40	300	North 1/
WI	Sawyer	055113	Park Falls WI	162.500	WXM91	500	
WI	Shawano	055115	Wausau WI	162.475	WXJ89	100	West 1/2
WI	Shawano	055115	Green Bay WI	162.550	KIG65	1000	East 1/2
WI	Monroe	055115	La Crosse WI	162.550	WXJ86	1000	
WI	Sheboygan	055117	Sheboygan WI	162.525	WWG91	200	
WI	Sheboygan	055117	Milwaukee WI	162.400	KEC60	1000	South 1/
WI	Sheboygan	055117	Fond du Lac WI	162.500	WWG87	1000	
WI	Taylor	055119	Wausau WI	162.475	WXJ89	100	
WI	Trempealeau	055121	La Crosse WI	162.550	WXJ86	1000	
WI	Vernon	055123	La Crosse WI	162.550	WXJ86	1000	
WI	Vernon	055123	Richland Center WI	162.450	WWG90	200	
WI	Vilas	055125	Park Falls WI	162.500	WXM91	500	West 1/3
WI	Vilas	055125	Crandon WI	162.450	WWG88	75	
WI	Walworth	055127	Milwaukee WI	162.400	KEC60	1000	
WI	Washburn	055129	--No NWR Coverage--				
WI	Washington	055131	Milwaukee WI	162.400	KEC60	1000	
WI	Washington	055131	Fond du Lac WI	162.500	WWG87	1000	
WI	Waukesha	055133	Milwaukee WI	162.400	KEC60	1000	
WI	Waupaca	055135	Wausau WI	162.475	WXJ89	100	
WI	Waushara	055137	Adams WI	162.400	WWF40	300	
WI	Winnebago	055139	Green Bay WI	162.550	KIG65	1000	
WI	Winnebago	055139	Fond du Lac WI	162.500	WWG87	1000	
WI	Wood	055141	Wausau WI	162.475	WXJ89	100	
WI	Wood	055141	Adams WI	162.400	WWF40	300	

National Communications Fast Food Frequencies

Fast Food Frequencies

Restaurant	Customer	Clerk
Arbys	30.8400	154.5700
	31.0000	170.3050
	457.5500	467.7750
	460.8875	465.8875
	461.0375	466.0375
Bo Jangles	33.4000	154.5400
Boston Market	33.1600	154.5150
Burger King	30.8400	154.5700
	31.0000	170.3050
	33.4000	154.5400
	457.5500	467.7750
	457.5625	467.7875
	457.5750	467.8000
	457.6000	467.8250
	460.8875	465.8875
	461.2875	466.2875
	461.5375	466.5375
	469.0125	464.0125
Chick Fil	31.0000	170.3050
Dairy Queen	30.8400	154.5700
Dunkin Donuts	30.8400	154.5700
	33.1600	154.5150
	33.4000	154.5400
	457.5500	467.7750
Hardees	30.8400	154.5700
	31.0000	170.3050
	35.0200	154.6000
	457.5375	467.7625
	460.8875	465.8875
	461.0875	466.0875
	461.1125	466.1125
	462.1625	467.1625
Jack in the Box	33.4000	154.5400
	35.0500	170.3050
	457.5750	467.8000
Kentucky Fried	30.8400	154.5700
	31.0000	170.3050
	33.1400	151.8950
	33.1600	154.5150
	33.4000	154.5400
	35.0200	154.6000
	457.5375	468.3875
	457.6000	467.8250
	460.8875	465.8875
	461.0875	466.0875
	462.1625	467.1625

	462.7625	467.8875
Long John Silvers	33.1600	154.5150
McDonalds	30.8400	154.5700
	31.0000	170.3050
	33.1400	151.8950
	35.0200	151.6000
	151.7150	169.4450
	151.7750	171.9050
	154.5700	170.2450
	154.6000	171.1050
	457.5375	461.0875
	457.5500	467.7750
	457.6000	467.8250
	460.8875	465.8875
	461.0375	466.0375
	461.0875	466.0875
	461.3125	466.3125
	463.2875	467.2875
	464.5125	469.5125
	469.0125	464.0125
	469.0625	464.0625
	469.1125	464.1125
	469.1375	464.1375
	469.1625	464.1625
	469.1875	464.1875
	469.3125	464.3125
	469.3375	464.3375
	469.3875	464.3875
	920.2000	903.2000
	920.2625	903.2625
	920.5000	903.5000
Mrs. Winners	30.8400	154.5700
Popeye's	33.4000	154.5400
	469.0125	464.0125
Rally's	30.8400	154.5700
	33.1600	154.5150
	457.5375	468.3875
	461.0875	466.0875
	461.5375	462.1625
	469.0125	464.0125
Roy Rogers	30.8400	154.5700
	33.1600	154.5150
	33.4000	154.5400
	457.5375	467.7625
	469.0125	464.0125
Sonic	33.1600	154.5150
Taco Bell	30.8400	154.5700
	31.0000	170.3050
	33.1600	154.5150
	33.4000	154.5400
	457.5375	468.3875
	457.5500	467.7750
	460.8875	465.8875

	461.0375	466.0375
	461.0875	466.0875
	461.5375	466.5375
	464.9625	469.9625
	469.0125	464.0125
TCBY	457.5500	467.7750
Wendys	31.0000	171.3050
	33.1600	154.5150
	33.4000	154.5400
	49.8300	49.8900
	457.5125	467.7375
	457.5375	467.7625
	457.5375	468.3875
	457.6125	467.8375
	460.8875	465.8875
	461.0875	466.0875
	461.8125	466.8125
	462.1625	467.1625
	464.9875	469.9875
	469.0125	464.0125
	469.2125	464.2125
What-a-burger	30.8400	154.5700
	457.5250	467.8250
	457.5500	467.7750
	457.6000	467.7500
	457.6125	467.7500
	460.0125	464.0125
	469.0375	464.0375
	469.0625	464.0625
	469.0875	464.0875
	469.1125	464.1125
	469.1375	464.1375
	469.1625	464.1625
	469.1875	464.1875
	469.2125	464.2125
	469.2875	464.2875
	469.3125	464.3125
	469.3375	464.3375
	469.3625	464.3625
	469.3875	464.3875
White Castle	457.6000	467.8250
Taco Bueno	30.8400	154.5700

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American Disaster Shortwave Radio Frequencies

Shared Resources (SHARES) Coordination Net (SCN)

Federal, State & Local government agencies nationwide.

5236.0	Channel 1	SCN Voice Net
14396.5	Channel 2	SCN Voice Net
4490.0	Channel 3	SCN ALE Net
5711.0	Channel 4	SCN ALE Net
9106.0	Channel 5	SCN ALE Net
11217.0	Channel 6	SCN ALE Net
15094.0	Channel 7	SCN ALE Net
17487.0	Channel 8	SCN ALE STI Net
6800.0	Channel 9	SCN BBS Net
13242.0	Channel 10	SCN BBS Net
10586.5	Channel XF	

Operation Secure (USB)

2326 2411 2414 2419 2422 2439 2463 2466 2471 2474 2487 2511 2535
2569 2587 2801 2804 2812 5135 5140 5167 5192 5195 7477 7480 7802
7805 7932 kHz

American Red Cross (USB)

2081 3170 5135 5140 6858 7549 7697 kHz

Federal Emergency Management Agency (FEMA)

All frequencies in kHz (mode USB and LSB)

Frequency 1	2320
Frequency 2	2360
Frequency 3	2377
Frequency 4	2445
Frequency 5/ALE	2658
Frequency 6/ALE	3341
Frequency 7	3379
Frequency 8	3388
Frequency 9	4603
Frequency 10	4780
Frequency 11	5211
Frequency 12	5378
Frequency 13	5402
Frequency 14	5821
Frequency 15	5961
Frequency 16/ALE	6049
Frequency 17	6106
Frequency 18	6108
Frequency 19	6151
Frequency 20	6176
Frequency 21/ALE	6809

Frequency 22/ALE	7348
Frequency 23	7428
Frequency 24/ALE	9462
Frequency 24/ALE	10194
Frequency 26	11108
Frequency 28	11721
Frequency 29	11801
Frequency 30	11957
Frequency 33	12129
Frequency 34	12216
Frequency 36/ALE	13446
Frequency 37/ALE	13935
Frequency 38	13894
Frequency 39	14567
Frequency 40	13783
Frequency 41	14450
Frequency 42	14776
Frequency 43	14836
Frequency 44/ALE	14885
Frequency 45	14899
Frequency 46	14908
Frequency 47	14872
Frequency 48	13956
Frequency 49	15840
Frequency 50	15708
Frequency 51/ALE	16201
Frequency 52	16238
Frequency 53/ALE	17519
Frequency 54	18483
Frequency 55	18744
Frequency 56	20361
Frequency 57/ALE	19969
Frequency 58	20027
Frequency 59	20063
Frequency 60/ALE	21866
Frequency 61	21919
Frequency 62/ALE	22983
Frequency 63	23028
Frequency 64	23390
Frequency 65	23451
Frequency 66	23550
Frequency 67	23814
Frequency 68	24008
Frequency 69	24282
Frequency 70	24526
Frequency 70/ALE	24819

Air Force Global HF System (GHFS)

4724, 6712, 6739, 8992, 11175, 13200, 15016

Andersen AB, Guam (Voice call Guam)
Andrews AFB, MD (Voice call Andrews Global) Discrete Frequency: 18015
Ascension Island (Voice call Ascension) Discrete Frequency: 11226
Croughton AB, UK (Voice call Croughton) Discrete Frequencies: 8032, 11226, 11271
Hickam AFB, HI (Voice call Hickam) Discrete Frequencies: 11181, 13242
Lajes AB, Azores (Voice call Lajes): 4724, 6712, 9025, 11181, 13212, 15016, Discrete Freq
Sigonella Naval Station. Italy (Voice call Sigonella): 4709 6724 9007, 11271 15038

U.S. Army Mars Emergency Network

7403.5 kHz USB 13997.5 kHz USB 13510.0 kHz USB

U.S. Navy

FACSFAC Jacksonville, FL 3166.0, 11252.0 kHz (USB) (Sealord)
FACSFAC Virginia Capes, VA 4372.0, 6712.0, 8967.0 kHz (USB) (Giant Killer)
Link 11 Voice Coordination Net /Southeast Coast 4070, 7653, 9005.4, 9023, 11114.5 kHz (USB

VOA'S Expanded Arabic Short Wave Transmissions

Time is UTC	Frequencies
0400-0600	56965, 7255, 9865, 11670, 15380
0730-0830	9660, 9715, 9765, 11805, 11820, 11995, 15205, 15355, 17685
1100-1130	15355, 15515, 17685
1400-1430	9825, 15495
1500-1530	9825, 13755, 15495
1600-1630	9825, 13755, 15495
1700-1800	6040, 7105, 11690
1800-1900	6040, 7105, 9505, 11750, 11825, 15545
1900-2000	6040, 7105, 9505, 11750, 11825, 15545
2000-2100	6040, 6160, 7105, 9505, 9620, 11825, 11895, 15545

Afghanistan
Frequency highly variable from 7082 to 7089 kHz. Regional languages, as well as English have been include for this clandestine.

Time is UTC	
0100-0215	Pashto daily
0215-0245	Dari daily
1500-1530	Unknown daily
1530-1545	English daily
1545-1600	Arabic daily
1600-1615	Turkmen daily
1615-1630	Uzbek daily
1630-1650	Urdu daily
1650-1710	Russian daily

Algeria

Time is UTC		Frequency
1900-2000	Spanish daily	11715, 15160

Egypt

Time is UTC		Frequency
0030-0430	Arabic daily	9900
0045-0200	Spanish daily	9475, 9740, 11715
1015-1215	Arabic daily	17745
1100-1130	Arabic daily	17800
1300-1600	Arabic daily	15220
1320-1450	Indonesian daily	17665
1500-1600	Hindi daily	17690
1500-1600	Russian daily	9730
1600-1800	Turkish daily	6230
1800-1900	Italian daily	9988
1900-2000	German daily	9990

2000-2200	Arabic daily	11990
2000-2115	French daily	9990
2030-2230	French daily	15335
2215-2330	Portuguese daily	15420
2330-0045	Arabic daily	15590, 17770

India

Time is UTC		Frequency
0315-0415	Hindi daily	13695, 15075, 15185, 17715
0430-0530	Hindi daily	15075, 15185, 17715
0430-0530	Arabic daily	13620, 15780, 17845
0845-0945	Indonesian daily	15775, 15780, 17485
1615-1715	Russian daily	11620, 15140
1615-1730	Hindi daily	7410, 9950, 13770, 17670
1730-1945	Arabic daily	9910, 13620
1945-2030	French daily	9910, 13750
1945-2045	Hindi daily	7410, 9950
2300-2359	Hindi daily	9910, 11740

Indonesia

Time is UTC		Frequency
0030-0100	Spanish daily	9525, 11785
0200-0300	Indonesia daily	9525, 11785
0300-0400	Arabic daily	9525, 11785
1200-1300	Indonesian daily	9525
1730-1800	Spanish daily	15150
1800-1900	German daily	15150
1900-2000	Indonesian daily	15150

Iran

Time is UTC		
0000-2359	Arabic daily global	Frequency
0000-0130	Arabic daily	6020, 7115, 9705, 11710
0130-0230	Arabic daily	7115
0230-0330	Arabic daily	7115, 9640, 9895, 15545
0330-0430	Arabic daily	7155, 7290, 9640, 9895, 13670, 15545
0330-0430	Arabic daily	7250, 9610
0430-0530	Arabic daily	9895, 13670, 15545
0530-0630	Arabic daily	9895, 15125, 15545
0630-0930	Arabic daily	15125, 15545
0930-1030	Arabic daily	15125, 15150, 15545, 17550, 21460, 21545
1030-1130	Arabic daily	13675, 15125, 15545, 17550, 21460, 21545
1130-1230	Arabic daily	13675, 15125, 15545, 17550, 21460, 21545
1230-1330	Arabic daily	15125, 15545
1330-1530	Arabic daily	9860, 13675, 15125, 15545
1530-1630	Arabic daily	9860, 15545
1630-1700	Arabic daily	6065, 6200, 9860, 13800
1700-1830	Arabic daily	6020, 6200, 9860, 13800
1830-2130	Arabic daily	6020, 6065, 6200, 7115, 9860, 13800
2130-2359	Arabic daily	6020, 7115, 11710
0000-0030	French daily	9022, 9560, 11970
0030-0130	Spanish daily	9515, 9655, 13755
0130-0230	Spanish daily	9560, 9655, 9810, 13755
0230-0300	Hindi daily	15165, 17635
0230-0330	Spanish daily	13730
0430-0600	Turkish daily	15260, 15365
0530-0630	Spanish daily	17590, 17785
0630-0700	French daily	17570, 17590, 21645
0630-0730	Italian daily	9022, 15084, 17560
0730-0830	German daily	15084, 17590
1200-1300	Italian daily	15084, 15235, 17605

1745-1830	Arabic daily	13590, 15725
1930-2000	French daily	11570, 15335
2300-2359	Urdu daily	9800

Qatar

Time is UTC		Frequency
0245-2130	Arabic daily	9570
0245-0700	Arabic daily	9695, 9700
0700-1300	Arabic daily	11710, 11865
1300-1700	Arabic daily	11655, 11660
1700-2130	Arabic daily	7110, 9525

Saudi Arabia

Time is UTC		Frequency
0400-0600	Turkish daily	15275
0800-1000	French daily	21600
1000-1200	Indonesian daily	21670
1400-1500	French daily	21600

Holy Koran Radio

Time is UTC		Frequency
0300-0600	Arabic daily	9675, 9715
0600-0800	Arabic daily	9715, 11818, 15380, 17895
0800-0900	Arabic daily	17895
0900-1200	Arabic daily	11935, 17615, 21495
1200-1400	Arabic daily	15380, 17895, 21600
1400-1500	Arabic daily	17760, 17895
1500-1600	Arabic daily	13690, 17760
1600-1800	Arabic daily	11710, 13690, 15205, 17560
1800-2100	Arabic daily	11935, 11950, 15230
2100-2300	Arabic daily	11820, 11935, 15230

Syria

Time is UTC		Frequency
1600-1700	Turkish daily	12085
1700-1800	Russian daily	13610
1805-1905	German daily	12085, 13610
1905-2005	French daily	12085, 13610
2215-2315	Arabic daily	12085, 13610
2315-0015	Spanish daily	12085, 13610

United Arab Emirates

Time is UTC		Frequency
0230-0350	Arabic daily	12005, 13675, 15400
0430-0530	Arabic daily	15435, 17830, 21700
0600-1030	Arabic daily	13675, 15395, 21605
1030-1150	Arabic daily	13675, 15395, 21605
1200-1330	Arabic daily	13630, 13675, 15395, 21605
1330-1350	Arabic daily	13630, 13675, 15395, 21605
1400-1600	Arabic daily	13630, 13675, 15395, 21605
1635-2100	Arabic daily	11950, 13630, 13675, 15395

Voice of America

English to Europe, Middle East and North Africa

0000-0030 UTC	1260, 1548
0100-0300 UTC	1548
0400-0430 UTC	792, 9530, 11965, 15205
0430-0500 UTC	9530, 11965, 15205
0500-0530 UTC	792, 1197, 9530, 11965, 15205

1400-1500	Russian daily	11960, 15190, 15290
1500-1530	Hindi daily	7180, 9720, 11710, 11775
1530-1630	Russian daily	9740, 9755, 11675, 11705, 11820, 11925, 1
1600-1730	Turkish daily	7165, 9022, 9550
1730-1830	Russian daily	6140, 7115, 7205, 7305
1730-1830	German daily	9022, 11765, 13665
1830-1930	French daily	9022, 11765, 11880, 13665, 11880, 13665,
1930-2030	Russian daily	6045, 7125, 7230, 9905
1930-2000	Italian daily	7295, 11765
2030-2130	Spanish daily	9022, 11765
2330-2359	French daily	9022, 9560

Iraq

Time is UTC		Frequency
0100-0200	Arabic daily	11785
0200-0230	German daily	11785
0230-0300	French daily	11785
1900-2000	Arabic daily	11785
1900-2100	Turkish daily	11785

Israel

Time is UTC		Frequency
0300-2115	Arabic daily	5915, 9815
0500-0515	French daily	15640, 17545
1000-1030	French daily	15640, 17545
1500-1525	Spanish (Sat)	15640, 17545, 17705
1530-1555	French daily	11605, 15640, 21670

Kuwait

Time is UTC		Frequency
0800-1000	Persian daily	9750
1600-1800	Urdu daily	15110

Sultanate of Oman

Time is UTC		Frequency
0000-0100	Arabic daily	9760
0100-0200	Arabic daily	7235
0200-0300	Arabic daily	6085, 7235
0300-0400	Arabic daily	6085
0400-0600	Arabic daily	9515, 15355
0600-1000	Arabic daily	13640, 17630
1000-1400	Arabic daily	13640
1400-1500	Arabic daily	15375
1500-1800	Arabic daily	15140, 15375
1800-2000	Arabic daily	6190, 15355
2000-2200	Arabic daily	6085, 9735
2200-2300	Arabic daily	9735
2300-2359	Arabic daily	9760

Pakistan

Time is UTC		Frequency
0045-0215	Urdu daily	15485, 17895
0200-0245	Hindi daily	11650, 15455
0500-0700	Urdu daily	15180, 17825, 21460
0800-1105	Urdu daily	17520, 216465
0900-0930	Indonesian daily	15625, 17660
1030-1115	Hindi daily	15625, 17655
1330-1530	Urdu daily	11570, 15100
1430-1515	Russian daily	7375, 9395
1630-1700	Turkish daily	13590, 15725
1700-1900	Urdu daily	11570, 15335

0530-0600 UTC 792, 9530, 11965, 15205,
0600-0700 UTC 792, 1197, 1260, 9530, 9680, 11805, 11965, 15205
0700-1400 UTC 1197
1400-1500 UTC 1197, 1548, 15255
1500-1530 UTC 1260, 1548, 9700, 15205, 15255
1530-1600 UTC 1197, 1260, 1548, 9700, 15205, 15255
1600-1700 UTC 1260, 1548, 9700, 15205, 15255
1700-1730 UTC 9700, 9760, 15255
1730-1800 UTC 1197, 9700, 9760, 15255
1800-1830 UTC 1197, 9760, 9770
1830-1900 UTC 792, 9760, 9770
1900-2000 UTC 6160, 9760, 9770
2000-2030 UTC 1197, 6095, 9760, 9770
2030-2100 UTC 1197, 6095, 9760, 9770
2100-2200 UTC 1260, 1548, 6040, 6095, 9530, 9760
2200-2230 UTC 1548
2230-2400 UTC 1260, 1548

English to Africa

0300-0330 UTC 909, 1530, 5855, 6080, 7105, 7275, 7290, 7340, 9575, 9885, 17895
0330-0400 UTC 909, 1530, 5855, 6080, 7105, 7275, 7290, 9575, 9885, 17895
0400-0430 UTC 909, 1530, 4960, 5855, 6080, 7275, 7290, 9575, 9885, 17895
0430-0500 UTC 909, 4960, 5855, 6080, 7275, 7290, 9575, 17895
0500-0600 UTC 909, 5970, 6035, 6080, 7195, 12080, 13670
0600-0630 UTC 909, 1530, 5970, 6035, 6080, 7195, 11995, 12080, 13670
0630-0700 UTC 909, 1530, 5970, 6035, 6080, 7195, 11995, 12080, 13670
1600-1700 UTC 909, 1530, 6035, 13605, 13710, 15225, 15410
1700-1730 UTC 909, 11920, 12040, 15240, 15445, 17895
1730-1800 UTC 909, 15410, 15455, 17895
1800-1830 UTC 909, 6035, 7415, 11975, 15410, 15580, 17895
1830-1900 UTC 909, 6035, 7415, 11690, 11975, 13730, 15410, 15525, 15580, 17895
1900-2000 UTC 909, 4950, 6035, 7375, 7415, 11975, 15410, 15445, 15580
2000-2030 UTC 909, 1530, 4950, 6035, 7375, 7415, 11855, 11975, 15410, 15445, 15580, 17745
2030-2100 UTC 909, 1530, 4950, 6035, 7375, 7415, 11975, 15410, 15445, 15580, 17745, 17895
2100-2200 UTC 909, 1530, 6035, 7375, 7415, 11975, 15410, 15445, 15580, 17895
2200-2230 UTC 909, 1530, 6035, 7340, 7375, 7415, 11975

English to Caribbean and Latin America

0000-0100 UTC 5995, 6130, 7405, 9455, 9775, 11695, 13740
0100-0130 UTC 5995, 6130, 7405, 9455, 9775, 13740
0130-0200 UTC 5995, 6130, 9455
0200-0400 UTC 1530, 1580
0400-0500 UTC 1530, 1580
1000-1100 UTC 6165, 7370, 9590

English to Far East Asia, South Asia and Oceania

0000-0030 UTC 1575, 7215, 9770, 11760, 15185, 15290, 17740, 17820
0100-0300 UTC 7115, 9635, 11705, 11725, 11820, 13650, 15250, 17740, 17820
0800-1000 UTC 11930, 13610, 15150
1000-1100 UTC 9770, 15240, 15425
1100-1130 UTC 1575, 6160, 9645, 9760, 9770, 15160, 15240, 15425
1130-1200 UTC 6160, 9645, 9760, 9770, 15160, 15240, 15425
1200-1230 UTC 1143, 6160, 9645, 9760, 15160, 15240, 15425
1230-1300 UTC 6160, 9645, 9760, 15160, 15240, 15425
1300-1400 UTC 6160, 9645, 9760, 15160, 15425
1400-1500 UTC 1143, 6160, 7125, 9645, 9760, 15160, 15425
1500-1600 UTC 7125, 9645
1600-1700 UTC 6160, 7125, 9645, 9760

1700-1800 UTC 1143, 1575, 5990, 6045, 6160, 7125, 7215, 9550, 9645, 9770, 9785
1900-2000 UTC 9525, 11805, 15180
2100-2200 UTC 9705, 11870, 15185, 17740, 17820
2200-2230 UTC 7215, 9705, 9770, 11760, 15185, 15290, 15305, 17740, 17820
2230-2400 UTC 1575, 7215, 9705, 9770, 11760, 15185, 15290, 15305, 17740, 17820

English Border Crossings

1900-2000 UTC 9550, 9840, 11780, 11970, 12015, 13725, 15235

English-Special

0030-0100 UTC 1548, 1575, 7215, 9770, 11760, 15185, 15290, 17740, 17820
0130-0200 UTC (Caribbean and Latin America) 7405, 9775, 13740
1500-1530 UTC (Asia) 1575, 6160, 9590, 9760, 9845, 12040, 15550
1530-1600 UTC (Asia) 1575, 6160, 9590, 9760, 9845, 12040, 15550
1600-1700 UTC (Africa) 13600, 15445, 17895
1900-1930 UTC (Middle East and Asia) 1197, 7260, 9680, 13690
1930-2000 UTC (Middle East and Asia) 1197, 7260, 9680, 13690
2030-2100 UTC (Europe) 1197
2300-2330 UTC (East & South Asia) 7190, 7200, 9545, 11925, 13775
2330-2400 UTC (East & South Asia) 7190, 7200, 7225, 7260, 9545, 11805, 11925, 13735, 1377

Kabul International airport
HF Frequencies
3467, 5658, 6547, 10018, 2966, 4132, 6828.5, 7318

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DTV Stations in Operation

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
New York, NY	1	WCBS-TV	CBS	2.n	56
		WNYW	FOX	5.n	44
		WLNY	IND	55.n	57
		WFTY	IND	67.n	23
		WMBC-TV	IND	63.n	18
		WFME-TV	Educational	66.n	29
		WEDW	PBS	49.n	52
		WLIW	PBS	21.n	22
		WNYE-TV	PBS	25.n	24
		WNET	PBS	13.n	61
		WPIX	WB	11.n	12
Los Angeles, CA	2	KTLA	WB	5.n	31
		KCET	PBS	28.n	59
		KCOP	UPN	13.n	66
		KOCE-TV	PBS	50.n	48
		KLCS	PBS	58.n	41
		KMEX-TV	Univision	34.n	35
		KNBC	NBC	4.n	36
		KSCI	IND	18.n	61
		KRCA-TV	IND	62.n	68
		KCAL-TV	IND	9.n	43
		KWHY-TV	IND	22.n	42
		KTTV	FOX	11.n	65
		KCBS-TV	CBS	2.n	60
		KABC-TV	ABC	7.n	53
Chicago, IL	3	WLS -TV	ABC	7.n	52
		WBBM-TV	CBS	2.n	3
		WFLD	FOX	32.n	31
		WCIU-TV	IND	26.n	27
		WJYS	IND	62.n	36
		WXFT	IND	60.n	59
		WMAQ-TV	NBC	5.n	29
		WWTO-TV	IND	35.n	10
		WSNS-TV	Telemundo	44.n	45
		WGBO-TV	Univision	66.n	53
		WCPX	PAX	38.n	43
		WPWR-TV	UPN	50.n	51
		WGN -TV	WB	9.n	19
		WYCC	PBS	20.n	21
		WTTW	PBS	11.n	47
Philadelphia, PA	4	WYBE	PBS	35.n	34
		WNJB	PBS	58.n	18
		WNJN	PBS	50.n	51
		WNJS	PBS	23.n	22
		WNJT	PBS	52.n	43
		WLVT-TV	PBS	39.n	62
		WPSG	UPN	57.n	32
		WCAU	NBC	10.n	67
		WHYY-TV	PBS	12.n	55
		WPHL-TV	WB	17.n	54
		WWSI-TV	Telemundo	62.n	49
		WWAC-TV	IND	53.n	44
		WTXF-TV	FOX	29.n	42
		WFMZ-TV	IND	69.n	46
		KYW -TV	CBS	3.n	26
		WPVI-TV	ABC	6.n	64
San Francisco-Oakland-San Jose, CA	5	KGO -TV	ABC	7.n	24
		KPIX	CBS	5.n	29
		KTSF	IND	26.n	27
		KRON-TV	IND	4.n	57
		KICU-TV	IND	36.n	52
		KFWU	IND	8.n	15
		KTLN-TV	IND	68.n	47
		KTVU	FOX	2.n	56
		KCNS-TV	IND	38.n	39
		KSTS	Telemundo	48.n	49
		KDTV-TV	Univision	14.n	51
		KNTV-TV	NBC	11.n	12
		KBWB	WB	20.n	19
		KQED	PBS	9.n	30
		KKPX	PAX	65.n	41
		KBHK-TV	UPN	44.n	45
Boston, MA (Manchester, NH)	6	WSBK-TV	UPN	38.n	39
		WNEU	PAX	60.n	34
		WENH	PBS	11.n	57
		WGBH-TV	PBS	2.n	19
		WGBX-TV	PBS	44.n	43
		WLVI-TV	WB	56.n	41
		WHDH	NBC	7.n	42
		WNDS	IND	50.n	35
		WFXT	FOX	25.n	31
		WUTF	IND	66.n	23
		WBZ -TV	CBS	4.n	30
		WCVB-TV	ABC	5.n	20
		WMUR-TV	ABC	9.n	59
Dallas-Ft. Worth, TX	7	WFAA-TV	ABC	8.n	9

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
		KTVT	CBS	11.n	19
		KDFW	FOX	4.n	35
		KLDT	IND	55.n	54
		KFWD	IND	52.n	51
		KDTX-TV	IND	58.n	45
		KSTR-TV	IND	49.n	48
		KDFI-TV	IND	27.n	36
		KXTX-TV	IND	39.n	40
		KUVN	Univision	23.n	24
		KXAS-TV	NBC	5.n	41
		KDAF	WB	33.n	32
		KPXD	PAX	68.n	42
		KTXA	UPN	21.n	18
		KERA-TV	PBS	13.n	14
Washington, DC (Hagerstown, MD)	8	WVPY	PBS	42.n	21
		WDCA	UPN	20.n	35
		WBDC-TV	WB	50.n	51
		WWPX	PAX	60.n	12
		WPXW	PAX	66.n	43
		WETA-TV	PBS	26.n	27
		WRC-TV	NBC	4.n	48
		WTTG-TV	FOX	5.n	36
		WJLA-TV	ABC	7.n	39
		WUSA TV	CBS	9.n	34
Atlanta, GA	9	WSB -TV	ABC	2.n	39
		WGCL	CBS	46.n	19
		WAGA	FOX	5.n	27
		WXIA-TV	NBC	11.n	10
		WTBS	IND	17.n	20
		WPXA	PAX	14.n	51
		WATL	WB	36.n	25
		WUPA	UPN	69.n	43
Detroit, MI	10	WKBD-TV	UPN	50.n	14
		WTVS	PBS	56.n	43
		WDIV	NBC	4.n	45
		WADL	FOX	38.n	39
		WJBK	FOX	2.n	58
		WWJ-TV	CBS	62.n	44
		WXYZ-TV	ABC	7.n	41
Houston, TX	11	KTRK-TV	ABC	13.n	32
		KHOU-TV	CBS	11.n	31
		KRIV	FOX	26.n	27
		KFTH	IND	67.n	36
		KNWS-TV	IND	51.n	52
		KTMD	Telemundo	48.n	48
		KPRC-TV	NBC	2.n	35
		KUHT	PBS	8.n	9
		KTXH	UPN	20.n	19
		KHWB	WB	39.n	38
Seattle-Tacoma, WA	12	KTWB-TV	WB	22.n	25
		KSTW	UPN	11.n	36
		KBTC-TV	PBS	28.n	27
		KCTS-TV	PBS	9.n	41
		KWPX	PAX	33.n	32
		KING-TV	NBC	5.n	48
		KWOG	IND	51.n	50
		KONG-TV	IND	16.n	31
		KCPQ	FOX	13.n	18
		KIRO-TV	CBS	7.n	39
		KOMO-TV	ABC	4.n	38
Tampa-St. Petersburg (Sarasota), FL	13	WFTS	ABC	28.n	29
		WWSB	ABC	40.n	52
		WTSP-TV	CBS	10.n	24
		WCLF	IND	22.n	21
		WTVT	FOX	13.n	12
		WFLA-TV	NBC	8.n	7
		WMOR	IND	32.n	19
		WXPX	PAX	66.n	42
		WEDU	PBS	3.n	54
		WTOG	UPN	44.n	59
		WTTA	WB	38.n	57
Minneapolis-St. Paul, MN	14	KMWB	WB	23.n	22
		WFTC	UPN	29.n	21
		KAWB	PBS	22.n	28
		KTCI-TV	PBS	17.n	16
		KARE-TV	NBC	11.n	35
		KMSP-TV	FOX	9.n	26
		KSTC-TV	IND	45.n	44
		WCCO-TV	CBS	4.n	32
		KCCO-TV	CBS	7.n	24
		KCCW-TV	CBS	12.n	20
		KSTP-TV	ABC	5.n	50
Cleveland-Akron (Canton), OH	15	WEWS	ABC	5.n	15
		WOIO	CBS	19.n	10
		WJW	FOX	8.n	31
		WMFD-TV	IND	68.n	12
		WKYC-TV	NBC	3.n	2
		WUAB	UPN	43.n	28
Phoenix, AZ	16	KUTP	UPN	45.n	26
		KAET	PBS	8.n	29
		KPPX	PAX	51.n	52
		KASW	WB	61.n	49
		KTVW-TV	Univision	33.n	34
		KPNX-TV	NBC	12.n	36
		KSAZ-TV	FOX	10.n	31
		KCFG	IND	9.n	32
		KAZT	IND	7.n	25
		KTVK-TV	IND	3.n	24
		KPAZ-TV	IND	21.n	20

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
		KPHO-TV	CBS	5.n	17
		KNXV	ABC	15.n	56
Miami-Ft. Lauderdale, FL	17	WPLG	ABC	10.n	9
		WFOR-TV	CBS	4.n	22
		WSVN-TV	FOX	7.n	8
		WSCV	Telemundo	51.n	52
		WAMI-TV	IND	69.n	47
		WLTV	Univision	23.n	24
		WLRN-TV	PBS	17.n	20
		WPBT	PBS	2.n	18
		WBFS-TV	UPN	33.n	32
		WBZL	WB	39.n	19
Denver, CO	18	KRMA-TV	PBS	6.n	18
		KMAS-TV	Telemundo	24.n	10
		KUSA-TV	NBC	9.n	16
		KFCT	FOX	22.n	21
		KDVR	FOX	31.n	32
		KCNC-TV	CBS	4.n	35
		KMGH-TV	ABC	7.n	17
Sacramento-Stockton-Modesto, CA	19	KXTV	ABC	10.n	61
		KOVR-TV	CBS	13.n	25
		KTXL	FOX	40.n	55
		KCRA-TV	NBC	3.n	35
		KUVS	Univision	19.n	18
		KMAX-TV	UPN	31.n	21
Orlando-Daytona Beach-Melbourne, FL	20	WRBW	UPN	65.n	41
		WKCF	WB	18.n	17
		WOPX	PAX	56.n	48
		WBCC	Educational	68.n	30
		WCEU	PBS	15.n	33
		WESH	NBC	2.n	11
		WRDQ	IND	27.n	14
		WOFL	FOX	35.n	22
		WVEN	IND	26.n	49
		WACX	IND	55.n	40
		WOTF	IND	43.n	20
		WKMG-TV	CBS	6.n	58
		WFTV	ABC	9.n	39
Pittsburgh, PA	21	WTAE-TV	ABC	4.n	51
		KDKA-TV	CBS	2.n	25
		WPGH-TV	FOX	53.n	43
		WPCB-TV	IND	40.n	50
		WPXI	NBC	11.n	48
		WQED	PBS	13.n	38
		WCWB-TV	WB	22.n	42
St. Louis, MO	22	WRBU	UPN	46.n	47
		KETC	PBS	9.n	39
		KSDK	NBC	5.n	35
		KTVI-TV	FOX	2.n	43
		KMOV	CBS	4.n	56
		KDNL-TV	ABC	30.n	31
Portland, OR	23	KATU	ABC	2.n	43
		KOIN	CBS	6.n	40
		KPTV	FOX	12.n	30
		KNMT-TV	IND	24.n	45
		KGW -TV	NBC	8.n	46
		KPDX	UPN	49.n	48
		KOPB-TV	PBS	10.n	27
Baltimore, MD	24	WBAL-TV	NBC	11.n	59
		WUTB	UPN	24.n	41
		WMPT	PBS	22.n	42
		WNUV-TV	WB	54.n	40
		WBFF	FOX	45.n	46
		WJZ -TV	CBS	13.n	38
		WMAR-TV	ABC	2.n	52
Indianapolis, IN	25	WRTV	ABC	6.n	25
		WISH-TV	CBS	8.n	9
		WXIN	FOX	59.n	45
		WCLJ	IND	42.n	56
		WHMB-TV	IND	40.n	16
		WTHR	NBC	13.n	46
		WTTV	WB	4.n	53
		WNDY	UPN	23.n	32
		WFYI	PBS	20.n	21
San Diego, CA	26	KPBS	PBS	15.n	30
		KUSI-TV	UPN	51.n	18
		KSWB-TV	WB	69.n	19
		KNSD	NBC	39.n	40
		KGTV	ABC	10.n	25
		KFMB-TV	CBS	8.n	55
Hartford & New Haven, CT	27	WFSB	CBS	3.n	33
		WTNH-TV	ABC	8.n	10
		WTXX	UPN	20.n	12
		WEDN	PBS	53.n	45
		WHPX	PAX	26.n	34
		WCTX	WB	59.n	39
Charlotte, NC	28	WWWB	WB	55.n	39
		WCNC-TV	NBC	36.n	22
		WJZY	UPN	46.n	47
		WUNG-TV	PBS	58.n	44
		WTVI	PBS	42.n	11
		WSOC-TV	ABC	9.n	34
		WBTV	CBS	3.n	23
		WAXN	IND	64.n	50
		WHKY-TV	IND	14.n	40
		WCCB	FOX	18.n	27
Raleigh-Durham (Fayetteville), NC	29	WRAY	HSN	30.n	42
		WRAZ	FOX	50.n	49
		WNCN-TV	NBC	17.n	55

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
		WRAL-TV	CBS	5.n	53
		WTVD	ABC	11.n	52
		WUNC-TV	PBS	4.n	59
		WUNP-TV	PBS	36.n	39
		WLFL	WB	22.n	57
		WRDC	UPN	28.n	27
		WFPX	PAX	62.n	36
		WRPX	PAX	47.n	15
Nashville, TN	30	WUXP	UPN	30.n	21
		WNAB	WB	58.n	23
		WKRN-TV	ABC	2.n	27
		WTVF	CBS	5.n	56
		WSMV	NBC	4.n	10
		WZTV	FOX	17.n	15
		WHTN	IND	39.n	38
Milwaukee, WI	31	WITI	FOX	6.n	33
		WTMJ-TV	NBC	4.n	28
		WWRS	IND	52.n	43
		WVCY-TV	IND	30.n	22
		WDJT-TV	CBS	58.n	46
		WISN-TV	ABC	12.n	34
		WVTV	WB	18.n	61
		WCGV-TV	UPN	24.n	25
		WMVS	PBS	10.n	8
Cincinnati, OH	32	WCET	PBS	48.n	34
		WSTR-TV	WB	64.n	33
		WCPO-TV	ABC	9.n	10
		WKRC-TV	CBS	12.n	31
		WLWT	NBC	5.n	35
		WXIX-TV	FOX	19.n	29
Kansas City, MO	33	WDAF-TV	FOX	4.n	34
		KCTV	CBS	5.n	24
		KMBC-TV	ABC	9.n	7
		KSMO-TV	WB	62.n	47
		KCPT	PBS	19.n	18
		KCWE	UPN	29.n	31
Columbus, OH	34	WWHO	UPN	53.n	46
		WCMH-TV	NBC	4.n	14
		WSYX	ABC	6.n	13
		WBNS-TV	CBS	10.n	21
		WTTE	FOX	28.n	36
		WSFJ	IND	51.n	24
Greenville-Spartanburg, SC-Asheville, NC-Anderson, SC	35	WYFF-TV	NBC	4.n	59
		WHNS	FOX	21.n	57
		WASV-TV	IND	62.n	45
		WSPA-TV	CBS	7.n	53
		WUNE-TV	PBS	17.n	54
		WUNF-TV	PBS	33.n	25
Salt Lake City, UT	36	KBYU-TV	PBS	11.n	44

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
		KUES	PBS	19.n	19
		KUEW	PBS	18.n	18
		KULC	Educational	9.n	36
		KUPX	PAX	30.n	29
		KUED	PBS	7.n	42
		KUWB	WB	16.n	48
		KUSG	CBS	12.n	9
		KUTV	CBS	2.n	34
		KTVX	ABC	4.n	40
		KJZZ	IND	14.n	46
		KSTU	FOX	13.n	28
		KSL -TV	NBC	5.n	38
San Antonio, TX	37	WOAI	NBC	4.n	58
		KVDA	Telemundo	60.n	38
		KWEX-TV	Univision	41.n	39
		KABB	FOX	29.n	30
		KSAT-TV	ABC	12.n	48
		KENS-TV	CBS	5.n	55
		KRRT	WB	35.n	32
		KLRN-TV	PBS	9.n	8
Grand Rapids-Kalamazoo-Battle Creek, MI	38	WZPX	PAX	43.n	44
		WZZM-TV	ABC	13.n	39
		WWMT	CBS	3.n	2
		WOTV	ABC	41.n	20
		WXMI	FOX	17.n	19
		WOOD-TV	NBC	8.n	7
West Palm Beach-Ft. Pierce, FL	39	WPTV	NBC	5.n	55
		WHDT-DT	IND	.n	59
		WFLX	FOX	29.n	28
		WPBF	ABC	25.n	16
		WPEC	CBS	12.n	13
		WTVX	UPN	34.n	50
Birmingham (Anniston, Tuscaloosa), AL	40	WABM-TV	UPN	68.n	36
		WBIQ	PBS	10.n	53
		WPXH	PAX	44.n	45
		WGIQ	PBS	43.n	44
		WTTO	WB	21.n	28
		WIAT	CBS	42.n	30
		WVTM-TV	NBC	13.n	52
Norfolk-Portsmouth-Newport News, VA	41	WAVY-TV	NBC	10.n	31
		WVBT	FOX	43.n	29
		WTKR-TV	CBS	3.n	40
		WVEC-TV	ABC	13.n	41
		WTVZ	WB	33.n	38
		WHRO-TV	PBS	15.n	16
		WPXV	PAX	49.n	46

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
		WGNT	UPN	27.n	50
New Orleans, LA	42	WUPL	UPN	54.n	24
		WDSU-TV	NBC	6.n	43
		WWL -TV	CBS	4.n	36
		WHNO-TV	IND	20.n	21
Memphis, TN	43	WBUY	IND	40.n	41
		WHBQ-TV	FOX	13.n	53
		WMC -TV	NBC	5.n	52
		WPTY-TV	ABC	24.n	25
		WREG-TV	CBS	3.n	28
		WPXX	PAX	50.n	51
		WLMT	UPN	30.n	31
Buffalo, NY	44	WIVB-TV	CBS	4.n	39
		WGRZ-TV	NBC	2.n	33
Oklahoma City, OK	45	KFOR-TV	NBC	4.n	27
		KOKH	FOX	25.n	24
		KTBO-TV	IND	14.n	15
		KSBI	IND	52.n	51
		KOCO-TV	ABC	5.n	7
		KOPX	PAX	62.n	50
		KOCB-TV	WB	34.n	33
Greensboro-High Point-Winston Salem, NC	46	WUPN-TV	UPN	48.n	33
		WTWB	WB	20.n	19
		WUNL-TV	PBS	26.n	32
		WXLV-TV	ABC	45.n	29
		WFMY-TV	CBS	2.n	51
		WGHP	FOX	8.n	35
		WXII	NBC	12.n	31
		WLXI-TV	IND	61.n	43
Harrisburg-Lancaster-Lebanon-York, PA	47	WGAL-TV	NBC	8.n	58
		WPMT	FOX	43.n	47
		WGCB-TV	IND	49.n	30
		WHP -TV	CBS	21.n	4
		WLYH-TV	UPN	15.n	23
		WITF-TV	PBS	33.n	36
Albuquerque-Santa Fe, NM	49	KNME-TV	PBS	5.n	35
		KENW	PBS	3.n	32
		KASA-TV	FOX	2.n	27
		KRQE	CBS	13.n	16
		KOAT-TV	ABC	7.n	21
		KOVT	ABC	10.n	12
		KOCT-TV	ABC	6.n	19
		KNAT	IND	23.n	24
		KOBR-TV	NBC	8.n	38
		KOB -TV	NBC	4.n	26
Louisville, KY	50	WDRB	FOX	41.n	49
		WHAS-TV	ABC	11.n	55
		WLKY	CBS	32.n	26
		WKPC-TV	PBS	15.n	17
		WKMJ	PBS	68.n	38
		WBNA	PAX	21.n	8
		WAVE	NBC	3.n	47
Jacksonville, FL	51	WJCT	PBS	7.n	38
		WJWB	WB	17.n	34
		WTEV-TV	CBS	47.n	19
		WJXX	ABC	25.n	10
		WAWS-TV	FOX	30.n	32
		WJXT	IND	4.n	42
		WTLV	NBC	12.n	13
Las Vegas, NV	52	KFBT	IND	33.n	29
		KVVU-TV	FOX	5.n	9
		KTNV-TV	ABC	13.n	12
		KLAS-TV	CBS	8.n	7
		KLVX	PBS	10.n	11
		KVBC	NBC	3.n	2
		KVWB	WB	21.n	22
Wilkes Barre-Scranton, PA	53	WBRE-TV	NBC	28.n	11
		WVIA-TV	PBS	44.n	41
		WYOU	CBS	22.n	13
		WNEP-TV	ABC	16.n	49
Austin, TX	54	KEYE	CBS	42.n	43
		KTBC	FOX	7.n	56
		KXAN-TV	NBC	36.n	21
		KNVA	WB	54.n	49
Albany-Schenectady-Troy, NY	55	WCDC	ABC	19.n	36
Little Rock-Pine Bluff, AR	56	KATV	ABC	7.n	22
		KLRT	FOX	16.n	30
		KTHV	CBS	11.n	12
		KARK-TV	NBC	4.n	32
		KASN	UPN	38.n	39
Fresno-Visalia, CA	57	KAIL	UPN	53.n	7
		KFRE-TV	WB	59.n	36
		KFTV	Univision	21.n	20
		KTFF	IND	61.n	48
		KGMC	IND	43.n	44
		KMPH	FOX	26.n	28
		KFSN-TV	ABC	30.n	9
Dayton, OH	58	WDTN	ABC	2.n	50
		WHIO-TV	CBS	7.n	41
		WKOI	IND	43.n	36
		WRGT-TV	FOX	45.n	30
		WBDT-TV	WB	26.n	18
		WPTD	PBS	16.n	58
		WKEF	NBC	22.n	51
Richmond-Petersburg, VA	59	WUPV	UPN	65.n	47

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
		WRLH-TV	FOX	35.n	26
		WWBT	NBC	12.n	54
		WTVR-TV	CBS	6.n	25
		WRIC-TV	ABC	8.n	22
Tulsa, OK	60	KOTV-TV	CBS	6.n	55
		KJRH	NBC	2.n	56
		KOKI-TV	FOX	23.n	22
		KDOR	IND	17.n	15
		KGEB	IND	53.n	49
		KTFO	UPN	41.n	42
		KTPX	PAX	44.n	28
Charleston-Huntington, WV	61	WLPX-TV	PAX	29.n	39
		WOUB-TV	PBS	20.n	27
		WPBY-TV	PBS	33.n	34
		WVAH-TV	FOX	11.n	19
		WTSF	IND	61.n	44
		WCHS-TV	ABC	8.n	41
Mobile, AL-Pensacola (Ft. Walton Beach), FL	62	WEAR-TV	ABC	3.n	17
		WKRG-TV	CBS	5.n	27
		WPMI	NBC	15.n	47
		WALA-TV	FOX	10.n	9
		WHBR	IND	33.n	34
		WSRE	PBS	23.n	31
		WJTC	UPN	44.n	45
		WEIQ	PBS	42.n	41
Knoxville, TN	63	WPXK	PAX	54.n	23
		WBIR-TV	NBC	10.n	31
		WBXX-TV	WB	20.n	50
		WETP-TV	PBS	2.n	41
		WTNZ-TV	FOX	43.n	34
		WATE-TV	ABC	6.n	26
Flint-Saginaw-Bay City, MI	64	WJRT-TV	ABC	12.n	36
		WNEM-TV	CBS	5.n	22
Lexington, KY	65	WKYT-TV	CBS	27.n	13
		WTVQ-TV	ABC	36.n	40
		WDKY-TV	FOX	56.n	4
		WCVN	PBS	54.n	24
		WKPI	PBS	22.n	24
		WKZT-TV	PBS	23.n	43
		WKAS	PBS	25.n	26
		WKSO-TV	PBS	29.n	14
		WKMR	PBS	38.n	15
		WKOH	PBS	31.n	30
		WKON	PBS	52.n	44
		WKHA	PBS	35.n	16
		WKLE	PBS	46.n	42
		WKMA	PBS	35.n	42
Wichita-Hutchinson, KS	66	KOOD	PBS	9.n	16

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
Plus					
		KPTS	PBS	8.n	29
		KDCK	PBS	21.n	21
		KWCV	WB	33.n	31
		KSCC	UPN	36.n	35
		KSAS-TV	FOX	24.n	26
		KAAS-TV	FOX	18.n	17
		KSNW	NBC	3.n	45
		KAKE-TV	ABC	10.n	21
		KWCH-TV	CBS	12.n	19
Roanoke-Lynchburg, VA	67	WDBJ	CBS	7.n	18
		WSLS-TV	NBC	10.n	30
		WJPR	FOX	21.n	20
		WSBN-TV	PBS	47.n	32
		WMSY-TV	PBS	52.n	42
		WBRA-TV	PBS	15.n	3
		WPXR	PAX	38.n	36
Toledo, OH	68	WUPW	FOX	36.n	46
		WNWO-TV	NBC	24.n	49
		WTOL-TV	CBS	11.n	17
		WTVG	ABC	13.n	19
Green Bay-Appleton, WI	69	WBAY-TV	ABC	2.n	23
		WFRV-TV	CBS	5.n	56
		WGBA	NBC	26.n	41
		WLUK-TV	FOX	11.n	51
		WPNE	PBS	38.n	42
		WACY	UPN	32.n	59
Ft. Myers-Naples, FL	70	WGCU-TV	PBS	30.n	33
		WBBH-TV	NBC	20.n	15
		WTVK	WB	46.n	45
		WFTX	FOX	36.n	35
		WZVN-TV	ABC	26.n	41
Honolulu, HI	71	KMAU	ABC	12.n	29
		KHVO	ABC	13.n	18
		KITV	ABC	4.n	40
		KHBC-TV	NBC	2.n	22
Des Moines-Ames, IA	72	WHO -TV	NBC	13.n	19
		KDSM-TV	FOX	17.n	16
		KCCI-TV	CBS	8.n	31
		KDIN-TV	PBS	11.n	50
Springfield, MO	73	KYTV	NBC	3.n	44
Tucson (Sierra Vista), AZ	74	KUAS-TV	PBS	27.n	28
		KUAT-TV	PBS	6.n	30
Paducah, KY-Cape Girardeau, MO-Harrisburg-Mt Vernon, IL	75	WKPD	PBS	29.n	41
		WKMU	PBS	21.n	36
		KBSI	FOX	23.n	22

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
		KFVS-TV	CBS	12.n	57
		WSIL-TV	ABC	3.n	34
		WPSD-TV	NBC	6.n	32
		WTCT	IND	27.n	17
Portland-Auburn, ME	76	WMTW-TV	ABC	8.n	46
		WGME-TV	CBS	13.n	38
		WCSH	NBC	6.n	44
		WCBB	PBS	10.n	17
		WMEA-TV	PBS	26.n	45
Rochester, NY	77	WROC-TV	CBS	8.n	45
		WHEC-TV	NBC	10.n	58
Omaha, NE	78	WOWT	NBC	6.n	22
		KPTM	FOX	42.n	43
		KMTV	CBS	3.n	45
		KETV	ABC	7.n	20
		KYNE-TV	PBS	26.n	17
		KXVO	WB	15.n	38
Spokane, WA	79	KSPS-TV	PBS	7.n	8
		KUID-TV	PBS	12.n	12
		KCDT	PBS	26.n	45
		KXLY-TV	ABC	4.n	13
		KLEW-TV	CBS	3.n	32
		KHQ -TV	NBC	6.n	15
Syracuse, NY	80	WSTM-TV	NBC	3.n	54
		WSYT	FOX	68.n	68
		WCNY-TV	PBS	24.n	25
Shreveport, LA	81	KLTS-TV	PBS	24.n	25
		KSLA-TV	CBS	12.n	17
		KTBS-TV	ABC	3.n	28
Champaign & Springfield-Decatur, IL	82	WAND	ABC	17.n	18
		WCIA	CBS	3.n	48
		WICD	NBC	15.n	41
		WICS	NBC	20.n	42
		WSEC	PBS	14.n	15
		WBUI	WB	23.n	22
		WCFN	UPN	49.n	53
Huntsville-Decatur (Florence), AL	83	WHIQ	PBS	25.n	24
		WAFF	NBC	48.n	49
		WZDX	FOX	54.n	41
		WHNT-TV	CBS	19.n	59
Columbia, SC	84	WLTX	CBS	19.n	17
		WOLO-TV	ABC	25.n	8
		WACH	FOX	57.n	48
		WIS	NBC	10.n	41
		WRLK-TV	PBS	35.n	32
Chattanooga, TN	85	WRCB-TV	NBC	3.n	13
		WTVC	ABC	9.n	35
		WDEF-TV	CBS	12.n	47

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
Madison, WI	86	WISC-TV	CBS	3.n	50
		WKOW-TV	ABC	27.n	26
		WMTV	NBC	15.n	19
		WMSN-TV	FOX	47.n	11
		WHA -TV	PBS	21.n	20
		WLEF-TV	PBS	36.n	47
South Bend-Elkhart, IN	87	WNIT-TV	PBS	34.n	35
		WSJV	FOX	28.n	58
		WHME-TV	IND	46.n	48
		WNDU-TV	NBC	16.n	42
		WSBT-TV	CBS	22.n	30
Cedar Rapids-Waterloo-Iowa City & Dubuque, IA	88	KGAN	CBS	2.n	51
		KCRG-TV	ABC	9.n	52
		KFXA	FOX	28.n	27
		KWWL	NBC	7.n	55
		KPXR	PAX	48.n	47
		KWKB	WB	20.n	25
Jackson, MS	89	WMPN-TV	PBS	29.n	20
		WMAU-TV	PBS	17.n	18
		WMAV-TV	PBS	18.n	36
		WDBD	WB	40.n	41
		WAPT	ABC	16.n	21
		WJTV	CBS	12.n	52
Tri-Cities, TN-VA	90	WJHL-TV	CBS	11.n	58
		WKPT-TV	ABC	19.n	27
		WEMT	FOX	39.n	38
		WCYB-TV	NBC	5.n	28
Burlington, VT-Plattsburgh, NY	91	WLED-TV	PBS	49.n	48
		WVTA	PBS	41.n	24
Davenport, IA-Rock Island-Moline, IL	92	KWQC-TV	NBC	6.n	56
		WQAD-TV	ABC	8.n	38
		WHBF-TV	CBS	4.n	58
		KLJB-TV	FOX	18.n	15
Waco-Temple-Bryan, TX	93	KWTX-TV	CBS	10.n	53
		KXXV	ABC	25.n	26
		KCEN-TV	NBC	6.n	9
		KAMU-TV	PBS	15.n	12
		KWBU	PBS	34.n	20
		KAKW	UPN	62.n	13
Baton Rouge, LA	95	WLPB-TV	PBS	27.n	25
		WBRZ	ABC	2.n	13
Johnstown-Altoona, PA	96	WATM-TV	ABC	23.n	24
		WTAJ-TV	CBS	10.n	32
		WJAC-TV	NBC	6.n	34
		WKBS-TV	IND	47.n	46
		WPSX-TV	PBS	3.n	15

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
Harlingen-Weslaco-Brownsville-Mcallen, TX	97	KGBT-TV	CBS	4.n	31
		KRGV-TV	ABC	5.n	13
Savannah, GA	98	WTOC-TV	CBS	11.n	15
		WSAV-TV	NBC	3.n	39
Evansville, IN	99	WEHT-TV	ABC	25.n	59
		WNIN	PBS	9.n	12
		WFIE-TV	NBC	14.n	46
		WAZE-TV	WB	19.n	20
Youngstown, OH	100	WYTV	ABC	33.n	36
El Paso, TX	101	KFOX-TV	FOX	14.n	28
		KTYO	Telemundo	48.n	47
		KRWG-TV	PBS	22.n	23
Lincoln & Hastings-Kearny Plus, NE	102	KUON-TV	PBS	12.n	40
		KHNE-TV	PBS	29.n	28
		KMNE-TV	PBS	7.n	15
		KRNE-TV	PBS	12.n	17
		KLNE-TV	PBS	3.n	26
		KHAS-TV	NBC	5.n	21
		KLKN	ABC	8.n	31
Greenville-New Bern-Washington, NC	103	WCTI	ABC	12.n	48
		WPXU	PAX	35.n	34
		WUNM-TV	PBS	19.n	18
		WUNK-TV	PBS	25.n	23
		WUND-TV	PBS	2.n	20
Ft. Wayne, IN	104	WFWA	PBS	39.n	40
		WINM	IND	63.n	12
Charleston, SC	105	WTAT-TV	FOX	24.n	40
		WCSC-TV	CBS	5.n	47
		WMMP	UPN	36.n	35
Springfield-Holyoke, MA	106	WGBY-TV	PBS	57.n	58
		WGGB-TV	ABC	40.n	55
		WWLP	NBC	22.n	11
Tallahassee, FL-Thomasville, GA	107	WTWC	NBC	40.n	2
Ft. Smith - Fayetteville-Springdale-Rogers, AR	108	KSBN-TV	IND	57.n	39
		KHBS	ABC	40.n	21
		KHOG-TV	ABC	29.n	15
		KFSM-TV	CBS	5.n	18
Florence-Myrtle Beach, SC	110	WBTW	CBS	13.n	56
		WPDE-TV	ABC	15.n	16
		WWMB	UPN	21.n	20
		WUNU	PBS	31.n	25
Lansing, MI	111	WLNS-TV	CBS	6.n	59
		WILX-TV	NBC	10.n	57

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
		WSYM-TV	FOX	47.n	38
Sioux Falls (Mitchell), SD	112	KDLT-TV	NBC	46.n	47
		KELO-TV	CBS	11.n	32
		KABY-TV	ABC	9.n	28
		KPRY-TV	ABC	4.n	19
		KSFY-TV	ABC	13.n	29
Traverse City-Cadillac, MI	113	WWTV	CBS	9.n	40
		WWUP-TV	CBS	10.n	49
		WFQX	FOX	33.n	47
Reno, NV	114	KRNV-TV	NBC	4.n	7
		KTVN	CBS	2.n	13
		KAME-TV	UPN	21.n	20
		KNPB	PBS	5.n	15
		KREN-TV	WB	27.n	26
Augusta, GA	115	WRDW-TV	CBS	12.n	31
		WFXG	FOX	54.n	51
Montgomery (Selma), AL	116	WMCF-TV	IND	45.n	46
Peoria-Bloomington, IL	117	WYZZ-TV	FOX	43.n	28
		WAOE	UPN	59.n	39
		WTVP	PBS	47.n	46
Fargo-Valley City, ND	118	KFME	PBS	13.n	23
		KVRR	FOX	15.n	19
Santa Barbara-Santa Maria-San Luis Obispo, CA	119	KTAS	Telemundo	33.n	34
		KSBY	NBC	6.n	15
Monterey-Salinas, CA	120	KSBW	NBC	8.n	10
Eugene, OR	121	KVAL-TV	CBS	13.n	25
		KPIC	CBS	4.n	19
		KCBY-TV	CBS	11.n	21
		KLSR-TV	FOX	34.n	31
		KEZI	ABC	9.n	14
		KOAC-TV	PBS	7.n	39
Macon, GA	122	WMAZ-TV	CBS	13.n	4
		WMGT	NBC	41.n	40
La Crosse-Eau Claire, WI	123	WKBT	CBS	8.n	41
		WXOW-TV	ABC	19.n	14
		WQOW-TV	ABC	18.n	15
		WHLA-TV	PBS	31.n	30
		WEAU-TV	NBC	13.n	39
Boise, ID	124	KAID	PBS	4.n	21
		KNIN-TV	UPN	9.n	10
		KIVI	ABC	6.n	24
		KBCI-TV	CBS	2.n	28
		KTVB	NBC	7.n	26
Lafayette, LA	125	KLFY-TV	CBS	10.n	56
Columbus, GA	126	WRBL	CBS	3.n	15
		WLTZ	NBC	38.n	35

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
		WXTX	FOX	54.n	49
Yakima-Pasco-Richland-Kennewick, WA	127	KNDO	NBC	23.n	16
		KNDU	NBC	25.n	26
		KIMA-TV	CBS	29.n	33
		KEPR-TV	CBS	19.n	18
		KTNW	PBS	31.n	38
Amarillo, TX	129	KFDA-TV	CBS	10.n	9
		KVIH-TV	ABC	12.n	20
		KVII-TV	ABC	7.n	23
Bakersfield, CA	130	KERO-TV	ABC	23.n	10
		KUVI-TV	UPN	45.n	55
Columbus-Tupelo-West Point, MS	131	WMAB-TV	PBS	2.n	10
		WCBI-TV	CBS	4.n	35
Chico-Redding, CA	132	KRCR-TV	ABC	7.n	34
Monroe, LA-El Dorado, AR	133	KNOE-TV	CBS	8.n	7
		KMCT-TV	IND	39.n	38
Wausau-Rhinelander, WI	134	WJFW-TV	NBC	12.n	16
		WAOW-TV	ABC	9.n	29
		WYOW	ABC	34.n	28
		WTPX	PAX	46.n	46
Rockford, IL	135	WTVO	ABC	17.n	16
		WIFR-TV	CBS	23.n	41
		WREX-TV	NBC	13.n	54
Duluth, MN-Superior, WI	136	KBJR-TV	NBC	6.n	19
		KQDS-TV	FOX	21.n	17
		WIRT	ABC	13.n	36
		WDIO-TV	ABC	10.n	43
		WDSE-TV	PBS	8.n	38
Beaumont-Port Arthur, TX	137	KBMT	ABC	12.n	50
		KFDM-TV	CBS	6.n	21
		KBTV	NBC	4.n	40
Topeka, KS	138	KSNT	NBC	27.n	28
		WIBW-TV	CBS	13.n	44
Columbia-Jefferson City, MO	139	KOMU-TV	NBC	8.n	36
		KMOS-TV	PBS	6.n	15
		KNLJ	UPN	25.n	20
Sioux City, IA	140	KXNE-TV	PBS	19.n	16
		KTIV-TV	NBC	4.n	41
		KPTH	FOX	44.n	49
		KCAU-TV	ABC	9.n	30
Medford-Klamath Falls, OR	141	KDKF	ABC	31.n	29
		KDRV	ABC	12.n	38
		KTVL	CBS	10.n	35

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
		KOTI	NBC	2.n	13
		KOBI	NBC	5.n	15
Wichita Falls, TX & Lawton, OK	142	KFDX-TV	NBC	3.n	28
		KJTL	FOX	18.n	15
		KAUZ-TV	CBS	6.n	22
Erie, PA	143	WICU-TV	NBC	12.n	52
		WQLN	PBS	54.n	50
Wilmington, NC	144	WUNJ-TV	PBS	39.n	29
		WSFX	FOX	26.n	30
		WWAY	ABC	3.n	46
Joplin, MO-Pittsburg, KS	145	KOAM-TV	CBS	7.n	13
Terre Haute, IN	146	WTHI-TV	CBS	10.n	24
		WVUT	PBS	22.n	52
Lubbock, TX	147	KCBD-TV	NBC	11.n	9
Albany, GA	148	WFXL	FOX	31.n	12
		WALB-TV	NBC	10.n	17
Bluefield-Beckley-Oak Hill, WV	149	WVVA	NBC	6.n	46
		WOAY-TV	ABC	4.n	50
Wheeling, WV-Steubenville, OH	150	WTRF-TV	CBS	7.n	32
		WTOV-TV	NBC	9.n	57
Salisbury, MD	151	WBOC-TV	CBS	16.n	21
Rochester, MN-Mason City, IA-Austin, MN	152	KIMT	CBS	3.n	42
		KAAL	ABC	6.n	33
		KTTC	NBC	10.n	36
		KXLT-TV	FOX	47.n	46
Bangor, ME	153	WVII-TV	ABC	7.n	14
		WABI-TV	CBS	5.n	19
		WLBZ	NBC	2.n	25
		WMEB-TV	PBS	12.n	9
		WMED-TV	PBS	13.n	10
Binghamton, NY	154	WBNG-TV	CBS	12.n	7
Minot-Bismarck-Dickinson (Williston), ND	155	KXMB-TV	CBS	12.n	23
		KBME-TV	PBS	3.n	22
Biloxi-Gulfport, MS	157	WMAH-TV	PBS	19.n	16
		WLOX-TV	ABC	13.n	39
Odessa-Midland, TX	158	KMID	ABC	2.n	26
		KOSA-TV	CBS	7.n	31
Panama City, FL	159	WMBB	ABC	13.n	19
		WFSG	PBS	56.n	38
Sherman, TX-Ada, OK	160	KXII	CBS	12.n	20
		KTEN	NBC	10.n	26
Palm Springs, CA	161	KMIR-TV	NBC	36.n	46
Gainesville, FL	162	WOGX	FOX	51.n	31

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
Abilene-Sweetwater, TX	163	KTAB-TV	CBS	32.n	24
		KTXS-TV	ABC	12.n	20
Quincy, IL-Hannibal, MO-Keokuk, IA	164	KHQA-TV	CBS	7.n	29
		WGEM-TV	NBC	10.n	54
Idaho Falls-Pocatello, ID	165	KIDK	CBS	3.n	36
		KISU-TV	PBS	10.n	17
Clarksburg-Weston, WV	166	WBOY-TV	NBC	12.n	52
Hattiesburg-Laurel, MS	168	WDAM-TV	NBC	7.n	28
		WHLT	CBS	22.n	58
Missoula, MT	169	KPAX-TV	CBS	8.n	7
		KCFW-TV	NBC	9.n	38
Billings, MT	170	KULR-TV	NBC	8.n	11
Dothan, AL	171	WDHN	ABC	18.n	21
Yuma, AZ-El Centro, CA	172	KSWT-TV	CBS	13.n	16
		KYMA	NBC	11.n	41
Lake Charles, LA	174	KLTL-TV	PBS	18.n	20
		KPLC-TV	NBC	7.n	8
Rapid City, SD	175	KHSD-TV	ABC	11.n	10
		KOTA-TV	ABC	3.n	2
		KBHE-TV	PBS	9.n	26
Harrisonburg, VA	178	WVPT	PBS	51.n	11
Alexandria, LA	179	KALB-TV	NBC	5.n	35
Bowling Green, KY	180	WBKO	ABC	13.n	33
		WKYU-TV	PBS	24.n	18
		WKGB-TV	PBS	53.n	48
Jonesboro, AR	181	KAIT-TV	ABC	8.n	9
Greenwood-Greenville, MS	182	WXVT	CBS	15.n	17
Grand Junction-Montrose, CO	184	KJCT-TV	ABC	8.n	7
Meridian, MS	185	WTOK-TV	ABC	11.n	49
		WGBC	NBC	30.n	31
Charlottesville, VA	186	WVIR-TV	NBC	29.n	32
Great Falls, MT	187	KFBB-TV	ABC	5.n	8
Lafayette, IN	189	WLFI-TV	CBS	18.n	11
Twin Falls, ID	191	KIPT	PBS	13.n	22
Lima, OH	194	WLIO	NBC	35.n	8
Butte-Bozeman, MT	195	KTVM	NBC	6.n	2
San Angelo, TX	196	KLST	CBS	8.n	11
Cheyenne, WY-Scottsbluff, NE	197	KKTU	NBC	33.n	11
		KTNE-TV	PBS	13.n	24
Casper-Riverton, WY	200	KCWC-TV	PBS	4.n	8
		KTWO-TV	NBC	2.n	17
Victoria, TX	204	KVCT	FOX	19.n	34

Market	Current DMA Rank	Station	Primary Network Affiliation	Tune To	RF Channel
		KAVU-TV	ABC	25.n	15
Presque Isle, ME	205	WMEM-TV	PBS	10.n	20
North Platte, NE	209	KPNE-TV	PBS	9.n	16
		KDUH-TV	ABC	4.n	7
		KNOP-TV	NBC	2.n	22
Puerto Rico		WKAQ-TV	Telemundo	2.n	28

National Communications Sports Frequencies

National Communications Sports Frequency Sampler

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Airshow Frequencies:

Common Frequencies:

122.725 - UNICOM/Non-Public
122.750 - Air to Air UNICOM
122.775
122.850 - MULTICOM/Federal
123.100
123.400
123.450
126.400 - Show Time Control
120.450 - Stunt Coordination
123.450 - Stunt Coordination
122.920 - Talk Through PA System
133.850 - Airshow Control
122.950 - UNICOM
123.125 - TO- 123.575 Flight Test
122.675 - TO- 123.000 Miscellaneous

Blue Angels

118.100
118.200
118.350 - Show Boss Victor
121.700 - Ground Support
121.900 - Ground Support
122.950 - Air to PA
123.400 - Common Airshow
134.100
140.050
141.560 - Maintenance Charlie
142.000 - Maintenance Alfa
142.025 - Maintenance Delta
142.260 - Ground
142.265 - Ground
142.625 - Maintenance
143.600 - Maintenance Channel 10
143.000 - Maintenance Bravo
146.2625
163.600
164.900 - Ground
168.900 - Ground
170.000 - Ground
170.900 - Ground
408.400 - Ground Support
418.050 - Ground Support

Golden Knights

32.300 - Operations
45.350 - Primary
122.925 - Freedom 1 & 2 Minijets
123.000 - Air to ground support
123.400 - Air coordination

123.450 - Air to ground support
123.475 - Air to ground support
123.500 - Air to ground support
124.000

Silver Eagles

30.500 - Air to Ground Comms
149.800 - Air to Ground Support

Snowbirds

141.850 - Air to air
413.025 - Ground Crew

Thunderbirds

114.950
118.100 - Operatons
118.200 - Operations
120.450 - Operations
123.400 - Airshow Common
123.450 - Air to air
124.920
134.100 - Operatons
138.875 - Operations
140.000 - Operations
140.400 - Air to air
141.300 - Operations
141.850 - Victor 1 (Primary)
142.000
143.100 - Ground Operations
143.5875
143.850 - Victor 2 (Secondary)
148.175
148.550 - Operations
148.850 - Operations
413.000
413.025 - Ground Operations F1
413.100 - Ground Operations F2

International Teams

Albania National Team

123.450
123.475

Brazil National Team
130.550
130.655
132.250

Chilean Halcones
136.175

French Patrol
141.825
143.100

Morocco Green

135.925
135.975

RAF Falcons
465.100

Spanish Aquilla Team
130.300
130.500

U.K. Blue Eagles
135.950
135.975
136.950
136.975

U. K. Red Devils Chutes
464.250
464.550
462.625

Commercial Teams

CAF
122.750
122.725
123.450
123.400

Coors Silver
126.150
122.925

Crunchie Team
118.000

Ecco Team
128.450
130.000
135.935
138.450

Fuji Team
122.850

Holiday Inn
123.450
123.150

Julie Clark
123.150

Kappa Team
123.450
124.450
122.700

Lima-Lima
123.150
123.175

Magic Team
122.750

Northern Lights
122.975

Otto the Copter
119.250
123.400

Red Baron Pizza
122.725

Red Stars
123.350

Rovers
129.925

Saeta Team
123.425
123.300

Sierra Aces
122.975

Team America
122.750
122.925
123.475

Toyota Team
126.550

Wayne Hanley
122.725

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Baseball Frequencies (Major League)

Frequency	Licensee	Location
461.9250	Anaheim Angels (Ushers)	Anaheim, CA
464.3250	Atlanta Braves	Atlanta, GA
464.4375	Baltimore Orioles	Baltimore, MD
463.3250	Boston Red Sox (Security)	Boston, MA
463.3625	Boston Red Sox (Stadium Ops)	Boston, MA
463.4125	Boston Red Sox (Media co-ord)	Boston, MA
464.0750	Boston Red Sox (Security)	Boston, MA
463.5875	Chicago Cubs	Chicago, IL
464.5875	Chicago Cubs (Security)	Chicago, IL
469.3125	Chicago Cubs	Chicago, IL
151.6250	Chicago White Sox	Chicago, IL
151.6850	Chicago White Sox	Chicago, IL
151.8350	Chicago White Sox	Chicago, IL
461.1625	Chicago White Sox	Chicago, IL
461.2000	Chicago White Sox	Chicago, IL
464.7500	Chicago White Sox (Operations)	Chicago, IL
468.8125	Chicago White Sox (Concessions)	Chicago, IL
462.1750	Cincinnati Reds, Incorporated	Cincinnati, OH
462.2125	Cincinnati Reds, Incorporated	Cincinnati, OH

462.8625	Cincinnati Reds, Incorporated	Cincinnati, OH
154.5150	Cleveland Indians Baseball Club	Cleveland, OH
466.1875	Detroit Tigers, Incorporated	Detroit, MI
466.8500	Detroit Tigers, Incorporated	Detroit, MI
464.1125	Houston Astros Baseball Club	Houston, TX
463.4500	Kansas City Royals Baseball Club	Kansas City, MO
464.8750	Kansas City Royals Baseball Club	Kansas City, MO
467.8250	Kansas City Royals Baseball Club	Kansas City, MO
151.6250	Los Angeles Dodgers (Media Rel)	Los Angeles, CA
151.7450	Los Angeles Dodgers	Los Angeles, CA
154.5700	Los Angeles Dodgers	Los Angeles, CA
464.5000	Los Angeles Dodgers	Los Angeles, CA
464.5500	Los Angeles Dodgers	Los Angeles, CA
151.6250	Milwaukee Brewers Baseball Club	Milwaukee, WI
151.8050	Milwaukee Brewers Baseball Club	Milwaukee, WI
151.9250	Milwaukee Brewers Baseball Club	Milwaukee, WI
469.5000	Milwaukee Brewers Baseball Club	Milwaukee, WI
469.5500	Milwaukee Brewers Baseball Club	Milwaukee, WI
897.6375	Milwaukee Brewers Baseball Club	Milwaukee, WI
897.6625	Milwaukee Brewers Baseball Club	Milwaukee, WI
935.1750	Milwaukee Brewers Baseball Club	Milwaukee, WI
935.2000	Milwaukee Brewers Baseball Club	Milwaukee, WI
935.2500	Milwaukee Brewers Baseball Club	Milwaukee, WI
936.6375	Milwaukee Brewers Baseball Club	Milwaukee, WI
936.6625	Milwaukee Brewers Baseball Club	Milwaukee, WI
935.6875	Milwaukee Brewers Baseball Club	Milwuakee, WI
461.2500	Minnesota Twins Baseball Club	Minneapolis, MN
464.5750	Minnesota Twins Baseball Club	Minneapolis, MN
464.7750	Minnesota Twins Baseball Club	Minneapolis, MN
151.6250	New York Mets Baseball	Flushing, NY
151.8350	New York Mets Baseball	Flushing, NY
151.6250	New York Yankees	Bronx, NY
464.3750	Oakland Athletics (Security)	Oakland, CA
464.4750	Oakland Athletics (Food Service)	Oakland, CA
154.5700	Philadelphia Phillies (Ushers/Sec)	Philadelphia, PA
151.6250	Pittsburgh Pirates	Pittsburgh, PA
467.7625	Pittsburgh Pirates	Pittsburgh, PA
467.7500	Pittsburgh Pirates	Pittsburgh, PA
467.8500	Pittsburgh Pirates	Pittsburgh, PA
467.9250	Pittsburgh Pirates	Pittsburgh, PA
464.3750	Saint Louis Cardinals	Saint Louis, MO
464.6750	Saint Louis Cardinals	Saint Louis, MO
464.5500	San Francisco Giants	San Francisco, CA
936.6375	San Francisco Giants	San Francisco, CA
936.6625	San Francisco Giants	San Francisco, CA
462.5500	Seattle Mariners	Seattle, WA
462.6000	Seattle Mariners	Seattle, WA
463.7125	Texas Rangers Baseball	Arlington, TX
464.5375	Texas Rangers Baseball (Security)	Arlington, TX
464.5625	Texas Rangers Baseball (Parking)	Arlington, TX

Baseball Frequencies (Minor League)

Frequency	Licensee	Location
151.6250	Albuquerque Pro. Baseball, Inc.	Albuquerque, NM
151.6250	Arkansas Travelers Baseball Club	Little Rock, AR
154.6000	Burlilngton Baseball Association	Burlington, IA
151.9250	Canton Akron Indians	Canton, OH
151.9550	Canton Akron Indians	Canton, OH

464.0125	Clinton Baseball Club	Clinton, IA
464.0625	Clinton Baseball Club	Clinton, IA
464.1375	Clinton Baseball Club	Clinton, IA
465.8875	Clinton Baseball Club	Clinton, IA
154.5700	Dayton Dragons (Camera Crew)	Dayton, OH
464.8125	Dayton Dragons (Maintenance)	Dayton, OH
463.8500	Dayton Dragons (Parking Ops.)	Dayton, OH
464.5000	Dayton Dragons (Security Ops.)	Dayton, OH
466.8125	Dayton Dragons (Tickets)	Dayton, OH
169.5050	Dayton Dragons (Wireless Mics.)	Dayton, OH
170.2450	Dayton Dragons (Wireless Mics.)	Dayton, OH
171.0450	Dayton Dragons (Wireless Mics.)	Dayton, OH
171.9050	Dayton Dragons (Wireless Mics.)	Dayton, OH
151.7150	Louisville Redbirds, Inc.	Louisville, KY
461.6125	Rockford Royals Pro Baseball	Rockford, IL
462.8625	Rockford Royals Pro Baseball	Rockford, IL
463.4125	Rockford Royals Pro Baseball	Rockford, IL
464.2375	Rockford Royals Pro Baseball	Rockford, IL
151.8650	Shreveport Baseball, Inc.	Shreveport, LA
154.5400	Sioux City Baseball Club, Inc.	Sioux City, IA
154.5700	Sioux City Baseball Club, Inc.	Sioux City, IA
154.6000	Sioux City Baseball Club, KInc.	Sioux City, IA
464.8250	Wichita Baseball, Inc.	Wichita, KS

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Boat Sports Frequencies

Off shore Power Boat Races 156.6250

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Football Frequencies

National Football League Frequencies

Frequency	Callsign	Licensee
461.36250	KNNF412	National Football League
461.38750	WNVD942	National Football League
461.46250	WNVD942	National Football League
461.48750	KNNF411	National Football League
461.48750	WNVD942	National Football League
461.56250	KNNF412	National Football League
461.61250	KNNF412	National Football League
461.61250	WNVD680	National Football League
461.66250	WNVD942	National Football League
461.68750	WNVD680	National Football League
461.71250	KNNF411	National Football League
461.73750	WNVD942	National Football League
461.76250	WNVD680	National Football League
461.88750	WNVD680	National Football League
461.91250	WNVD680	National Football League
461.93750	WNVD942	National Football League
462.06250	KNNF412	National Football League
462.08750	WNVD942	National Football League
462.11250	KNNF411	National Football League
462.13750	KNNF412	National Football League
463.23750	WPFJ318	National Football League
463.28750	KNNF412	National Football League
463.31250	KNNF411	National Football League
463.31250	WNVD942	National Football League
463.36250	WNVD680	National Football League

463.43750	WNVD942	National Football League
463.46250	KNNF411	National Football League
463.46250	WNVD680	National Football League
463.51250	KNNF412	National Football League
463.56250	KNNF411	National Football League
463.56250	WNVD942	National Football League
463.61250	WNVD942	National Football League
463.68750	KNNF411	National Football League
463.73750	KNNF411	National Football League
463.73750	WNVD942	National Football League
463.78750	WNVD942	National Football League
463.81250	KNNF411	National Football League
463.83750	WNVD680	National Football League
463.86250	WNVD942	National Football League
463.88750	KNNF412	National Football League
463.91250	KNNF411	National Football League
463.93750	KNNF411	National Football League
463.93750	WNVD680	National Football League
463.96250	KNNF412	National Football League
463.96250	WNVD680	National Football League
463.98750	KNNF411	National Football League
464.03750	WNVD680	National Football League
464.08750	WNVD680	National Football League
464.18750	WNVD942	National Football League
464.36250	WNVD680	National Football League
464.43750	KNNF411	National Football League
464.48750	KNNF412	National Football League
464.51250	KNNF411	National Football League
464.53750	KNNF412	National Football League
464.58750	KNNF412	National Football League
464.61250	KNNF411	National Football League
464.68750	KNNF411	National Football League
464.73750	KNNF412	National Football League
464.73750	WNVD680	National Football League
464.78750	KNNF412	National Football League
464.83750	KNNF412	National Football League
464.86250	KNNF411	National Football League
464.86250	WNVD680	National Football League
464.88750	KNNF411	National Football League
464.93750	KNNF411	National Football League
466.36250	KNNF412	National Football League
466.48750	KNNF411	National Football League
466.56250	KNNF412	National Football League
466.61250	KNNF412	National Football League
466.71250	KNNF411	National Football League
467.06250	KNNF412	National Football League
467.11250	KNNF411	National Football League
467.13750	KNNF412	National Football League
468.23750	WPFJ318	National Football League
468.28750	KNNF412	National Football League
468.31250	KNNF411	National Football League
468.46250	KNNF411	National Football League
468.51250	KNNF412	National Football League
468.56250	KNNF411	National Football League
468.68750	KNNF411	National Football League
468.73750	KNNF411	National Football League
468.81250	KNNF411	National Football League
468.88750	KNNF412	National Football League
468.91250	KNNF411	National Football League
468.93750	KNNF411	National Football League
468.96250	KNNF412	National Football League

468.98750	KNNF411	National Football League
469.43750	KNNF411	National Football League
469.48750	KNNF412	National Football League
469.51250	KNNF411	National Football League
469.53750	KNNF412	National Football League
469.58750	KNNF412	National Football League
469.61250	KNNF411	National Football League
469.68750	KNNF411	National Football League
469.73750	KNNF412	National Football League
469.78750	KNNF412	National Football League
469.83750	KNNF412	National Football League
469.86250	KNNF411	National Football League
469.88750	KNNF411	National Football League
469.93750	KNNF411	National Football League

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General Sporting Event Frequencies

Goodyear Blimp	151.6250
	161.6400
	161.7000
	161.7600
	132.0000

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Golf Frequencies

Frequency	Licensee	Location
154.6000	American Junior Golf Association	Roswell, GA
461.2125	Ben Hogan Tour	Ponte Verda Bch, FL
461.5375	Ben Hogan Tour	Ponte Verda Bch, FL
462.8125	Ben Hogan Tour	Ponte Verda Bch, FL
463.3375	Ben Hogan Tour	Ponte Verda Bch, FL
463.8875	Ben Hogan Tour	Ponte Verda Bch, FL
466.2125	Ben Hogan Tour	Ponte Verda Bch, FL
466.5375	Ben Hogan Tour	Ponte Verda Bch, FL
467.8125	Ben Hogan Tour	Ponte Verda Bch, FL
468.3375	Ben Hogan Tour	Ponte Verda Bch, FL
468.8875	Ben Hogan Tour	Ponte Verda Bch, FL
151.6250	Butler National Golf Club	Oakbrook, IL
154.5700	Carolina Golf Association	Clemmons, NC
469.5000	Golf Course Superintendents Assoc.	Lawrence, KS
464.5500	Golf Incorporated	St. Cloud, MN
151.6250	Golf Spectrum Corporation	Wesley Chapel, FL
154.5700	Golf Spectrum Corporation	Wesley Chapel, FL
464.5500	Golf Spectrum Corporation	Wesley Chapel, FL
151.6250	Gulf States PGA	New Orleans, LA
461.5000	Hardees Golf Classic	Davenport, IA
464.9750	Hardees Golf Classic	Davenport, IA
151.6850	Illinois Junior Golf Association	Oak Brook, IL
151.7150	Illinois Junior Golf Association	Oak Brook, IL
151.7750	Illinois Junior Golf Association	Oak Brook, IL
151.6250	Kansas Golf Association	Lawrence, KS
151.6250	KGA PGA, Incorporated	Louisville, KY
466.0375	Michigan PGA	Walled Lake, MI
466.1000	Michigan PGA	Walled Lake, MI
464.5000	Northern Texas PGA	Plano, TX
464.5500	Northern Texas PGA	Plano, TX
151.9250	PGA Tour	Ponte Verda Bch, FL
151.9550	PGA Tour	Ponte Verda Bch, FL

469.5500	PGA Tour	Ponte Verda Bch, FL
461.5625	PGA Tour Construction Services	Dearborn, MI
151.6250	Players West Golf Tour	Mountain View, CA
151.6250	Southern Golf Association	Birmingham, AL
151.9250	Southern Golf Association	Birmingham, AL
464.5000	Southern Texas PGA	The Woodlands, TX
464.5500	Southern Texas PGA	The Woodlands, TX
469.5000	Southern Texas PGA	The Woodlands, TX
469.5500	Southern Texas PGA	The Woodlands, TX
464.5000	Sun Country Golf Association, Inc.	Albuquerque, NM
151.6250	Tennessee Golf Association	Nashville, TN
151.6250	Nevada State Junior Golf Assoc.	Las Vegas, NV
151.6250	United States Golf Association	Far Hills, NJ
461.0375	United States Golf Association	Far Hills, NJ
461.0625	United States Golf Association	Far Hills, NJ
461.0875	United States Golf Association	Far Hills, NJ
461.1125	United States Golf Association	Far Hills, NJ
461.1375	United States Golf Association	Far Hills, NJ
461.1625	United States Golf Association	Far Hills, NJ
461.1875	United States Golf Association	Far Hills, NJ
461.2125	United States Golf Association	Far Hills, NJ
461.2375	United States Golf Association	Far Hills, NJ
461.2625	United States Golf Association	Far Hills, NJ
461.3875	United States Golf Association	Far Hills, NJ
461.4125	United States Golf Association	Far Hills, NJ
461.4375	United States Golf Association	Far Hills, NJ
461.4625	United States Golf Association	Far Hills, NJ
461.4875	United States Golf Association	Far Hills, NJ
461.5125	United States Golf Association	Far Hills, NJ
461.5375	United States Golf Association	Far Hills, NJ
461.5625	United States Golf Association	Far Hills, NJ
461.5875	United States Golf Association	Far Hills, NJ
461.6125	United States Golf Association	Far Hills, NJ
461.6375	United States Golf Association	Far Hills, NJ
461.6625	United States Golf Association	Far Hills, NJ
461.6875	United States Golf Association	Far Hills, NJ
464.5000	United States Golf Association	Far Hills, NJ
469.5000	United States Golf Association	Far Hills, NJ
42.9800	Westchester Golf Association	Larchmont, NY
151.8050	Women's Golf Association of Phila.	King of Prussia, PA
464.5500	Women's Southern CA Golf Assoc.	San Dimas, CA
469.5000	Women's Trans Natonal Golf Assoc.	Pompano Beach, FL

Racing Frequencies

ARCA -- By Driver Number:

Car#	Driver	Main	Secondary	Additional
1	Butts	463.5875		
2	Barfield	466.9750		
3	Shelmerdine	464.8875	469.0125	
4	Dave Boggs	466.9125		
6	Rick Logan	466.7125		
7	Lance Hopper	458.1125		
8	Alan Bigelow	468.5750		
9	Hall	467.7500		
10	Brewer	463.7875	466.3750	
11	Morgan	460.0125	469.1125	

12	Tracey	467.5750	
13	Young	465.8625	
14		462.1500	
15	Dale Kreider	469.6000	469.5500
16	Steele	461.2125	463.3625
18	Baltes	467.7625	467.8125
19	Kevin Councilor	463.5750	
20	Alexander	466.4000	464.5500
21	Strait	461.3500	464.5500
22	Alan Markovitz	465.5500	
22	Mike Swaim	469.9625	
23	Cox	463.9500	462.6750
24	Weber	469.5500	
25	Andy Genzaman	452.8500	
27	Doug Keller	464.3375	468.9625
27	Irwin	466.9500	
28	Smith	461.4875	466.9750
29	Darrell Lanigan	459.3550	
30	Mark Voigt	461.5750	461.6750
31	Ritter	467.5000	
32	Stahl	461.8250	
33	DeVane	463.1250	462.6250
35	Sheppard	466.3625	463.5750
40	Belmont	466.8625	
42	Bainey	461.8875	
42	Pardus	468.2125	464.5500
43	Bobby Hamilton Jr	461.6625	
43	Ray	461.0750	
44	Flowers	469.4125	467.1125
45	Jimmie Kite	463.4750	462.0875
46	Kimmel	464.6625	
48	Jim Lamoreaux	467.8375	
49	Kenny Brown	461.0250	
50	Martin	461.1375	
52	Baird	457.5625	466.7375
52	Fellows	467.6875	468.3750
54	Bainey	461.8875	
55	Marc Brenner	462.2000	
56	Whittymore	467.7625	
57	Strandtman	462.8125	461.6375
58	Wilkonson	468.9625	469.9625
59	Gibson	467.7000	
60	Zack	461.8500	
62	Bramley	459.1875	
64	Harrell	466.4875	
66	Thompson	463.1125	465.8125
69	Miller	466.8250	
70	Meazell	467.2650	
72	Mark Coleman	465.8625	
73	Curtis	468.2500	
74	Laton	461.6875	
75	Bob Schact	461.0375	461.1000
76	Drew White	468.7625	
80	Andy Hillenburg	464.2375	
80	Dave Blaney	466.8625	
82	Cunningham	461.8250	
83	Billy Venturini	466.3750	
84	Benning	464.9875	464.5875
85	Bobby Gerhart	465.8875	
85	Jerry Middleton	467.0000	
86		457.8875	

88	Shane Yoder	463.1125	465.8875
88	McCune	467.8750	468.7625
89	Altiere	464.5000	
90	Berrier	468.4625	
92	Michael Zazula	468.4875	
93	Larson	467.4250	461.2125
94	Greg User	469.4375	
95	Clark	457.5125	
97	Doles	462.2000	
99	Jeff Finley	459.8375	
00	Eckert	463.6375	
01	Nobach	462.9375	
05	Hill	462.0000	
05	Reid III	458.1375	466.4000
06	Conz	467.3375	

American Speed Association -- By Driver Number:

Car#	Driver	Main	Secondary	Additional
1	Joe Nott	469.4125	467.7625	
2	Tony Raines	463.6125		
3	Yale Conley	451.6125	468.2625	
5	Steve Holzhausen	461.8875	468.3875	
6	Dave Sensiba	462.8875		
7	Gary Str. Amant	462.0625		
8	Mike Garvey	464.5125	464.4500	
9	Dennis Lampman	465.6375	461.8500	
11	Doug Mayr	469.2000		
18	Mike Miller	462.8625		
21	K Knuttleman	462.8375		
23	Rick Beebe	463.8500	459.7750	
25	Gary Terry	469.9500	465.7375	
26	Bill Baird	468.8000	467.5125	
27	Ray Skillman	464.8500		
28	Tim Taylor	468.3375	468.3125	
30	Jeff Fultz	451.6125	468.2125	
31	Danny Doeler	460.8125	464.1875	
32	Greg Stewart	464.9750	464.5000	
33	Brad Loney	466.4125	464.3000	
35	Buddy Schrock	460.2750	461.7250	
40	Peter Cozzolion	469.3125	459.4875	
45	Adam Petty	468.3000	468.5000	
46	Rus Gamester	463.6125		
48	Joe Nott	468.5500	468.7000	
51	Brandon Sperling	469.9125	463.2500	
52	Scott Hansen	461.0875	467.6875	
55	Ed Ochylski	459.0125	461.4250	
56	Brett Bell	467.8500		
58	Billy Turner	464.7125	460.8750	
66	Kurt Hough	462.1825	462.2375	
72	Junior Hanley	457.7125	460.6000	
79	Travis Price	461.0125	463.2125	
80	Harold Fair Jr.	466.5875	466.5125	
81	Harold Fair	466.5875	466.5125	
84	Bob Senneker	464.2625	463.7375	
87	Steve Carlson	463.1875	462.0375	
88	Mike Eddy	461.5625	461.5375	
92	Sammy Pegram	461.8875	466.1375	

93	Alce Pinonneault	469.0750	461.4375	
94	Fred Bear Jr.	463.0875		
02	Phil Massuch	462.1125	462.0500	
07	Jack Landis	463.5000	463.3000	

ASA Officials Channel #1	469.5000
ASA Officials Channel #2	469.5500
ASA Officials Channel #3	461.9875
ASA Officials Scoring	460.0375

Busch Grand National -- By Driver Number:

Car#	Driver	Main	Secondary	Additional
1	Sterling Marlin	461.0000	468.7000	
2	Rickie Craven	466.9750	462.6375	464.1125
3	Dale Earnhardt	466.9250	466.5250	
4	Jeff Purvis	463.5875	464.3000	464.3875
5	Terry Labonte	460.3125	461.2375	469.3250
6	Joe Bessey	465.6375	465.6375	463.8250
				462.7125
				469.5500
7	Danny Edward	463.3125	461.8375	
8	Bobby Hillen, Jr.	463.1125		
9	Jeff Burton	466.2750	466.8675	
10	Phil Parsons	466.7875	462.9875	
11	Kevin Cywinski	462.4625	464.2500	
12	Jim Spencer	461.9875	469.8373	
14	Patty Moise	464.6625	463.2375	464.1375
15	Ken Schrader	466.7375		
16	Mark Day	461.7500	467.2875	
17	Matt Kenseth	469.5125	463.7125	
18	Bobby Labonte	467.7625		
20	Blaise Alexander	464.7625		
21	Michael Waltrip	463.2375	461.4875	
22	Adam Petty	467.1625		
23	Atwood	462.3875		
27	Jonny Rumley	465.5625		
28	Casey Atwood	459.5625		
29	Hermie Sadler	467.0375	466.8625	
30	Todd Bodine	469.3625	465.9125	
31	Dale/Jason	466.2500	466.5250	
32	Jarrett	463.7375	461.4375	
33	Tim Fedewa	461.8625	461.9625	
34	Mike McLaughin	462.5275	469.6750	
35	Lyndon Amick	466.4000		
36	David Green	469.1250	465.6625	
37	Mark Green	469.9375	469.9375	
38	Elton Sawyer	467.9375	467.8625	
40	Kevin Lepage	468.7625	459.2125	
43	Dennis Setzer	461.1750		
44	Tony Stewart	469.3625	468.6375	
45	B. Loney	468.4875		
46	Gary Laton	461.6875		
47	Andy Santerre	468.5750		
48	Dale Shaw	460.1875	460.5875	
49	Kyle Petty	461.7125	461.8875	
50	Jimmy Foster	468.8125	468.8250	
51	Jim Brown	461.6625	463.1875	

52	Grubb	468.8125	468.8250
55	Phil Pearson	467.1375	
56	Jeff Krogh	460.9250	466.4875
57	Jason Keller	461.7750	461.5000
59	Robert Pressley	463.8875	468.4625
60	Mark Martin	460.9500	
63	Tracy Leslie	462.1875	468.3125
64	Dick Trickle	468.0875	467.1875
66	Elliott Sadler	464.5125	468.2375
70	Dale Fischlein	466.6750	461.4375
72	Mike Dillion	469.8125	469.1250
74	Randy LaJoie	460.5625	462.7375
75	Wilson	462.0750	
77	Ed Berrier	463.8125	463.4125
78	Hank Krogh	468.7875	
80	Mark Krogh	462.0875	466.4875
83	Grubb	463.8000	466.1500
84	Chaffin	467.2625	
85	Shane Hall	461.3000	465.1125
87	Joe Nemechek	460.2375	468.8375
88	Kevin Schwantz	466.6125	461.5625
89	Ashton Lewis	461.3250	463.6375
90	Kevin Price	461.0375	469.9625
92	Derrick Cope	460.2125	461.9875
93	Dave Blaney	462.8375	468.9375
94	Ron Barfield	469.8750	463.7625
96	K. Petty	462.8125	469.2125
97	Reid	458.1375	458.1500
98	Kenny Irwin	463.7125	460.5875
99	Glenn Allen Jr.	459.1875	465.2125
00	Buckshot Jones	464.6250	464.7250

Busch Officials	461.2000
Busch Officials	463.6250
Flagman	466.8000
Scoring	464.3250

Bush Grand National (North)

Car #	Driver	Main	Secondary	Additional
0	B. Penfold	467.1625	463.6500	
0	R. Zacherius	460.9750		
1	J. Beasley	469.5500	469.5000	469.7750
2	D. Meservey	469.8625	466.6875	
2	R. Hersey	463.6750		
3	T. Fox	464.0125	464.0375	
3	R. Snyder	467.6750		
4	B. Bennett	461.6750		
5	B. McRae	460.3125		
6	M. Truex	467.3250		
7	B. Dragon	463.2875	463.2625	
8	G. Sullivan	461.1625		
8	T. Rosati	465.8625		
9	S. Deware	461.3875		
9	P. Rondeau	463.8250		
10	B. Dugan	469.0625		
11	B. Healey	460.8750		
12	D. Davis	466.1250		

13	Christopher	465.0125	465.2125	
15	J. Marquis	468.1125	464.5500	
16	S. Fadden	461.7375		
17	B. Brunnel	462.1250	464.6250	
18	R. Brown	462.4375		
19	K. Stuart	463.8125		
21	E. Bodine	469.6750		
22	J. Barry	464.6000		
24	C. Robie	469.5875		
25	J. Aube	469.9000		
26	S. Bouley	465.6375		
27	P. Spencer	468.5625		
29	D. Dion	464.3500		
30	D. Doyle	464.9125		
		461.0875		
31	R. MacDonald	451.0125		
32	D. Quarterly	463.6500		
34	G. Sullivan	466.6625		
		461.0250		
37	A. Chapman	466.1250		
38	B. Branscombe	468.5125		
39	L. Gillie	466.4500		
41	J. Aubie	461.1125	463.9875	464.8750
42	T. Carey	466.2375		
43	L. Sherwood	463.2125		
46	H. Browning	467.9000		
47	K. Moore	457.0500	466.7250	
50	R. Roubinek	462.0125		
50	S. Hall	465.8750		
50	B. Gahan	466.8875		
51	M. Stefanick	468.9000	465.8625	
53	G. Clark	463.3375		
54	G. Gravel	469.8125		
55	B. Leighton	459.6750		
58	M. Porcaro	463.3625		
60	J. Pezza	463.6500		
60	D. Shaw	465.8625	462.1250	
60	B. Haley	464.8125		
61	M. Olson	460.7125	465.3500	
63	J. Raudabauch	464.2750		
65	D. Crystal	467.4250		
67	J. Aube	461.5250		
67	J. Barnes	461.1125		
69	J. Spraker	466.0750	461.0750	
70	J. Boardman	466.1875		
73	B. Walls	463.6500		
74	T. Gordon	468.7375		
74	J. Visconte	466.0375	466.5750	
75	P. Daniels	465.3500		
76	T. Bolles	468.5250		
77	B. Walls	463.6500		
79	T. Cray	466.0125		
81	D. Mesrvey	468.8625		
82	K. Kidder	460.7000		
83	B. Miller	466.8125		
86	D. Demars	469.2000		
87	E. Spencer	461.9875		
87	P. Spencer	468.5625		
87	R. Thiel	461.8000		
88	B. Roubine	465.9750	462.0125	
90	H. Drugg	461.4625		

92	M. Gallo	462.2875	
94	S. Hoddick	468.4125	469.2125
95	B. Donley	465.9625	
96	A. Rainone	467.7250	467.7750
96	D. Donahue	463.8375	
97	R. Wilson	465.6375	
99	S. Howakowski	461.6000	461.3000
02	J. Cerbone	469.0875	
03	M. Purcell	460.9250	
07	J. Wall	461.1125	

Bert Ross Indy Style Racing School

Channel #1	466.5375
Channel #2	461.5625

CART -- By Driver Number:

Car#	Driver	Main	Secondary	Additional
1	Alex Zanardi	469.8875		
2	Al Unser Jr.	854.8375	852.1875	855.7875
3	Andre Riberio	857.8375	852.1875	855.9125
5	Gil De Ferran	461.0625	463.2375	461.0125
6	Michael Andretti	461.2875	461.7125	462.6500
				468.3625
7	Bobby Rahal	468.2625	469.2625	
8	Bryan Harta	468.7125	467.7375	
9	J.J. Lehto	461.1375	461.4750	
10	Richie Hearn	467.4375	461.4870	
11	Fittipaldi	461.8625	461.7125	462.1375
				461.2875
				468.2250
12	Jimmy Vasser	467.0375	461.1125	
15	Roberto Moreno	466.1500		
16	Castro-Neves	853.4875	857.9675	
17	Gugelmin	468.4625	462.7625	462.4625
18	Mark Blundell	466.4625	466.7625	462.4625
19	Michel Jourdian Jr.	461.7375		
20	Scott Pruett	464.0875	461.1750	
21	Tony Kanaan	469.3125	469.2125	467.3125
24	Robby Gordon	461.7500	463.7750	
25	Max Papis	467.7500	463.3500	467.8000
				468.8125
26	Paul Tracy	466.3250	467.1750	
27	Dario Franchittl	466.5375	466.2625	
33	Patrick Carpentier	461.5375	463.3875	
34	Dennis Vitolo	460.6875		
36	Alex Barron	469.9250		
40	Adrian Fernandez	461.8875	468.9000	463.900
77	Arnd Meier	464.9375	467.1875	
98	P.J. Jones	463.7375		
99	Greg Moore	466.8875	466.4875	

CART Officials:

CART Channel #1	Comption	457.0125
CART Channel #2	Operations	457.1875

CART Channel #4	Pace Car(s)	451.5250
CART Channel #6	Safety Team	451.8125

Craftsman Truck Series -- By Driver Number:

Car#	Driver	Main	Secondary	Additional
1	Bobby Hamilton	461.5625		
2	Mike Bliss	462.2875	463.2875	
3	Jay Sauter	462.1250	466.9250	
4	Sedgewick	466.4750		
5	Jamie Skinner	461.6500		
6	Rick Carelli	466.3875		
7	Barry Bodine	457.3750	465.6375	466.3125
9	D. Starr	466.3125		
10	Lonnie Rush Jr.	461.6750	460.7250	
11	Matt Hutter	461.1125		
12	Dave Stacy	461.1125		
13	Jimmy Davis	469.9625		
14	Rick Carawford	461.8750	462.6500	
15	Rob Morgan	462.9125		
16	Ron Honaday Jr.	466.5250	466.8250	469.0125
18	Butch Miller	468.4125	461.8375	
19	Tony Rains	461.8375	463.3750	464.0625
20	Brendan Gaughan	462.6500	461.6500	
22	Bryan Reffner	461.4500		
23	B Buttler	467.2875	461.3375	468.2120
24	Jack Sprage	466.3375	464.2125	469.4875
25	Andy Genzman	452.8125		
26	Randy MacDonald	469.5125		
27	Rob Rizzo	463.8750		
29	Dennis Setzer	463.8750	464.6250	464.6250
30	Kelly Denton	467.0000		
31	Kevin Cywinski	451.9625		
32	Curtis Markham	462.7125		
33	Jay Stewart	461.8000		
35	Ron Barfield	461.9500	461.3500	
37	Scot Walters	469.9375	469.5500	
38	Clark	463.3375		
39	Gross	466.7625		
41	Fisher	461.8000		
42	Carey	469.3875		
43	Jimmy Hensley	469.2000	461.4125	
44	Boris Said III	464.9625	462.1625	
46	Morgan	462.0000		
47	Monty Klein	469.9375		
48	Ron Fedowa	461.4750		
49	David Starr	466.3125		
50	Greg Biffle	460.9500	466.2750	
51	Tammy Jo Kirk	468.8250		
52	Mike Wallace	461.0875	457.6875	
53	Ken Schrader	467.6870'		
55	Tony Roper	461.3000		
57	Chuck Bown	462.2000	467.7000	
58	Jacks	461.0500		
60	Andy Houston	461.8000	464.5250	
61	Randy Tolsma	468.4375	461.0375	461.2125
63	B Myers	460.9625		
64	Michael Dokken	461.4000		

65	Wilson	464.3125	
66	Renfrow	464.0500	
68	M Gravey	464.4750	462.5625
75	Kevin Harvick	457.8125	466.2250
77	Gary St. Amant	463.6750	
78	Randy Renfrow	466.2250	
80	Greg Biffle	466.2750	
82	Randy Nelson	464.2625	
83	Joe Gaita	464.0125	
84	Wayne Anderson	463.7125	463.7375
86	Stacy Compton	467.9875	
87	Joe Nemechek	460.2375	463.7125
88	Terry Cook	468.6875	
90	Lance Norich	466.4125	
92	Doug George	462.3625	
93	Mike Skinner	461.5375	
98	Wayne Anderson	463.7125	
99	Joe Ruttman	468.4500	460.9500
00	B Kimmel	464.6625	
01	B. Ogle	463.8875	
02	E. Norris	462.2875	
03	Shelmerdine	464.8875	
04	Dennis Setzer	465.2625	
05	J. Blewett	463.3750	
06	R MacDonald	461.3250	461.0500
08	Felix Giles	466.2500	
09	Jeff Belewett	454.2000	

Craftsman Truck Series Officials: 462.6750 463.8500 463.6250
468.8500 464.6000 461.2000

Featherlite Modified -- By Driver Number:

Car#	Driver	Main	Secondary	Additional
0	Kennedy	463.7750	464.5375	
1	John Blewett	468.5125		
2	Reggie Ruggiero	457.5375	457.5125	
3	Tony Hirschman	466.1500		
4	Myers	463.4000		
4	Tim Connolly	467.7625	464.9500	464.8500
5	Charlie Pasteryak	467.2375	469.2375	
6	Mike Stefanik	467.7625	463.3125	
7	Tom Baldwin	465.3125		
8	Sam Russo	462.6875		
9	Jake Savory	469.3375		
10	McCarthy	467.7625		
10	Spiers	464.3375		
10A	Dan Avery	461.1250		
11	Flemke	461.7875		
13	Ted Christopher	461.3500	465.0125	
14	Bolles	462.5625		
14	Woodly Jr	468.5125		
16	Chris Kopec	469.9625		
18	Kerry Malone	467.6500		
18	Spiers	464.3375		
18	Mammolito	468.1875		
20	Long	466.1250		

21	Mike Ewanitsko	464.6125	466.1875	464.6375
25	John Preston	461.8750	461.2750	
26	Boardwick	469.9125		
27	Kluth	464.0125		
30	Satch Worley Jr.	461.2000	469.7875	
31	Tony Ferrante Jr.	467.9125	467.8875	
32	Berghman	463.2875	465.6250	
33	Hedger	463.3500		
33	Cole	461.4125	464.7625	
35	S. J. Evonsian	467.8125		
36	D'Alessanoro	469.5500		
38	Rudolph	467.1250		
40	Pat DePointe	460.1250	467.8625	
41	Hedgecock	469.6750		
42	Dave Peacko	467.0250		
44	Tommy Cravenho	853.4875		
47	Jack Bateman	464.7125		
48	Wolcot	461.6625		
49	Smith	467.1125		
49	Young	462.9125		
50	Clark	467.8125		
51	Ritter	463.8000	468.8500	
54	Hietala	468.7625	464.9125	
56	Swisher	468.8125	464.5500	
58	Amen	464.0750		
60	Wolcott	464.3000		
63	Hoore	463.2500		
67	Papale	461.4250		
68	Bush	466.0750	461.0750	
69	Miller	466.8875		
75	Jefferys	463.7750		
77	Bolles	466.6375	461.9875	461.5750
77	Ed Fidanza	462.0125		
81	Bruce Driver	464.4625	469.5125	
82	Watt	463.1125		
90	Ken Wooley Jr.	463.6375		
92	Markovic	461.1500		
95	Sherwood	463.2125		
95	Markovic	468.6500		
95	Kulaga	464.8750		
98	French	469.1375		
99	Jamie Tomaino	463.7875	464.8625	463.7875
00	Tim Arre	468.8125	460.1125	
01	Zavisva	155.7300		
03	Bruce Taylor	461.7000		
03	Hedger	463.3500		
04	Berube	468.9375		
04	Dresser	463.2625		
07	Marvin	463.5500		
07	Fleming	464.9250		
09	Schofield	464.6250	464.1125	

Featherlite Officials 461.2000 469.5000

Indy Lights -- By Driver Number:

Car#	Driver	Main	Secondary	Additional

1	Dare	468.5375
2	Cristiano da Matta	466.8375
3	Paese	469.4125
5	Andersson	460.2875
8	Clint Mears	469.9750
9	Casy Mears	461.1750
11	A Boss	469.6625
14	Geoff Boss	463.1250
	Brain Cunningham	
15	Cunningham	464.0500
17	Morris	461.9375
21	Giaffone	464.6625
27	Naoki Hattori	464.5875
	Bob Dorricott Jr.	
28	Lavin	461.2375
31	Peter	467.8125
32	Servia	458.1625
41	Mike Borkowski	464.6250
77	Tony Renna	461.8750
	Tony Kanaan	
	Airton Dare	

Indy Racing League -- By Driver Number:

Car#	Driver	Main	Secondary	Additional
1	Tony Stewart	467.7625	468.4375	
3	Robby Buhl	468.4375	464.2625	
4	Scott Goodyear	467.1750	463.2375	462.9875
5	Arie Luyendyk	461.4625	463.7875	
6	Davey Hamilton	461.8625		
7	Jimmy Kite	461.3875		
8	Scott Sharp	468.2500		
9	Johnny Unser	466.2000		
10	Mike Groff	462.1375		
11	Billy Boat	860.8625	855.0875	
12	Buzz Calkines	469.6875	469.6875	
14	Kenny Brack	860.9125	855.0875	860.8875
15	Eliseo Salazer	463.8750		
16	Marco Greco	468.4750		
17	Andy Michner	463.7750	465.8875	467.4375
18	Jack Hewitt	466.5875	464.4625	
19	Stan Wattles	466.7750	462.0125	463.7750
20	Tyce Carlson	468.6375	459.3375	
21	Roberto Guerrero	463.3625	463.7125	468.7125
22	David Steele	159.5850		
23	Paul Durant	463.1125		
27	John Paul Jr.	461.5125		
28	Mark Dismore	456.9125	469.2250	
30	Raul Boesel	468.9875		
33	Billy Roe	462.0875	464.9125	
35	Jeff Ward	467.1625		
40	Dr. Jack	461.1125	469.4000	457.9875
44	J.J. Yeley	469.5375		
51	Eddie Cheever Jr.	462.9875		
52	Robby Unser	469.8625		
53	Jim Guthrie	467.0125		
55	Steve Knapp	463.5750		
77	Stephan Gergoire	468.0125	453.5375	

81	John Paul	462.3625	
91	Buddy Laazier	464.6250	464.7000
97	Greg Ray	465.9875	468.7125
98	Donnie Beechler	469.9000	463.9125
99	Sam Schmidt	469.5000	

Indy Racing League Officials:

IRL Channel #1	464.1750
IRL Channel #2	464.7750
IRL Channel #3	465.8125
IRL Safety	453.3125

Modifieds -- By Driver Number:

Car #	Driver	Main	Secondary	Additional
0	E. Kennedy	463.7750	464.5375	
1	J. Blewett	468.5125		
2	R. Ruggiero	457.5375	457.5125	
3	T. Hirschmann	466.1500		
4	G. Myers	463.4000		
4	T. Connolly	467.7625	464.8500	464.9500
5	C. Pasteryak	467.2375	469.2375	
X6	M. Stefanik	467.7625	463.3125	
7	T. Baldwin	465.1125		
8	R. Fuller	462.6875		
9	R. Savory	469.3375		
10	J. McCarthy	467.7625		
10	E. Sspiers	464.3375		
10A	D. Avery	461.1250		
11	E. Flemke	461.7875		
13	Christopher	461.3500	465.0125	
14	T. Bolles	462.5625		
14	K. Wooley, Jr.	468.5125		
16	C. Kopec	469.9635		
18	K. Malone	467.6500		
18	E. Spires	464.3375		
18	J. Mammolito	468.1875		
20	J. Long	466.1250		
21	M. Ewanitsko	464.6125	464.6375	466.1875
25	J. Leaty	461.8750	461.2750	
26	F. Boardwick	469.9125		
27	D. Kluth	464.0125		
30	S. Worley	461.2000	469.7875	
31	T. Ferrante	467.9125	467.8875	
32	D. Berghman	463.2875	465.6250	
33	K. Heagy	463.2125		
33	W. Cole	461.4125	464.7625	
33	R. Hedger	463.3500		
35	S. Evonsian	467.8125		
36	D'Alessandro	469.5500	468.8375	469.9125
38	D. Rudolph	467.1250		
40	P. DePonte	460.0125	467.8625	
41	J. Hedgecock	469.6750		
42	D. Pecko	467.0250		
44	T. Cravenho	853.4875		
47	J. Bateman	464.7125		
48	Wolcott	461.6625		

49	E. Smith	467.1125		
49	C. Young	462.9125		
50	R. Clark	467.8125		
51	S. Ritter	463.8000	468.8500	
54	B. Hietala	468.7625	464.9125	
56	Swisher	468.8125	464.5500	
58	C. Amen	464.0750		
60	D. Wolcott	464.3000		
63	L. Moore	463.2500		
67	T. Papale	461.4250		
68	J. Bush	466.0750	461.0750	
69	J. Miller	466.8875		
72D	Wolcott	461.6625		
75	R. Jeffreys	463.7750		
75	C. Pasteryak	466.3625		
77	T. Bolles	466.6375	461.5750	461.9875
77	S. Fidanza	462.0125		
81	B. Driver	464.4625	469.5125	
82	D. Watt	463.1125		
90	K. Wooley	463.6375		
92	T. Markovic	461.1500		
95	L. Sherwood	463.2125		
95	J. Markovic	468.6500		
95	J. Kulaga	464.8750		
98	D. French	469.1375		
		462.4750		
99	J. Tomaino	463.7875	463.7875	464.8625
00	T. Arre	468.8125	460.1125	
03	B. Taylor	461.7000		
03	R. Hedger	463.3500		
04	D. Berube	468.9375		
04	B. Dresser	463.2625		
07	B. Marvin	463.5500		
07	F. Fleming	464.9250		
09	B. Schofield	464.6250	464.1125	
Modified Officials:		461.2000	469.5000	

NASCAR -- By Driver Number:

Car#	Driver	Main	Secondary	Additional
1	Steve Park	466.2500	466.2250	
2	Rusty Wallace	461.5875	461.3375	
3	Dale Earnhardt	462.0250	469.0125	
4	Bobby Hamilton	461.7500	464.1750	461.7500
5	Terry Labonte	468.2125	469.4875	
6	Mark Martin	460.9500	468.5625	
7	Geoff Bodine	457.3750	463.1750	
8	Hut Stricklin	452.3000	465.8875	465.8850
9	Jerry Nadeau	464.1750	463.9750	
10	Ricky Rudd	465.7375	469.9375	463.7375
11	Brett Bodine	855.5125	855.5625	
12	Jeremy Mayfield	462.7125	469.6625	462.5250
13	Dennis Setzer	469.8750	468.6750	
16	Kevin LePage	468.4500	466.2750	
18	Bobby Labonte	467.7625	467.1875	
21	Michael Waltrip	855.0375	855.2875	854.7875
22	Ward Burton	468.9375	462.8375	

23	Jimmy Spencer	469.8375		
24	Jeff Gordon	465.8625	467.0625	469.4875
26	Johnny Benson	469.0250	461.7375	468.5625
28	Kenny Irwin	466.9500	466.4500	
30	Derrike Cope	466.3000	469.0000	469.1250
31	Mike Skinner	468.2500	462.1250	466.9250
33	Ken Schrader	466.7375	468.7750	
35	Darrell Waltrip	465.2875		
36	Ernie Irvan	463.2875	467.0375	
40	Sterling Marlin	461.0000	460.9750	463.9625
41	Steve Grissom	459.3625	461.5625	
42	Joe Nemechek	460.9750		
43	John Andretti	468.3000		
44	Kyle Petty	469.3000	469.8000	
46	Jeff Green	468.8000	468.0000	
47	Billy Standridge	469.0375	457.5125	
50	Wally Dallenbach	466.7875	469.4875	
71	Dave Marcis	467.5625		
75	Rick Mast	468.9750	461.9375	
77	Robert Pressley	463.8875	468.8875	
78	Gary Bradberry	451.7875	463.9000	454.3500
81	Kenny Wallace	459.3875	459.2875	
88	Dale Jarrett	468.5250	466.3750	
90	Dick Trickle	467.1625	461.5375	
91	TBA	468.1875	460.6875	
94	Bill Elliott	469.3625	468.6750	469.8750
96	David Green	464.8875	461.4750	
97	Chad Little	460.6625	463.4250	
98	Rich Bickle	468.7250	469.1500	
99	Jeff Burton	466.2750	466.8625	

NASCAR Channel 1	469.5000
NASCAR Channel 2	464.5000
NASCAR Channel 3	464.9000
NASCAR Channel 4	464.7750
NASCAR Channel 5	465.0250
NASCAR Channel 6	463.8500
NASCAR Channel 7	461.2000
NASCAR Channel 8	464.9750
NASCAR Channel 9	468.6250
NASCAR Channel 10	463.6250
NASCAR Channel 11	464.6000
NASCAR Scoring Channel 1	466.4500
NASCAR Scoring Channel 2	466.1250
NASCAR Inspectors	468.8500

NHRA Drag Racing:

Driver	Main	Secondary	Additional
Top Fuel			
Joe Amoto	469.4000		
Ron Capps	463.3000		
Tom Johnson	457.5500		
Rance McDaniel	461.3375		
Steve Stanials	459.9875		

Funny Cars

Gordie Bonlon	463.4250	
John Force	466.5500	
Gordon Mineo	463.3250	
Steve Staniais	467.4375	
Paul Smith	461.2250	
Dean Skuza	464.1500	
Al Hoffman	468.7000	467.2500

Officials:

Chief Starter	461.0750
Control (Tower)	464.5000
Alternate	461.6250
Alternate	461.8250
Alternate	464.5500

Northwest Tour:

Car#	Driver	Main	Secondary	Additional
1	D. Geyer	461.1625		
2	J. Bennedetti	461.5000		
3	R. Shultz	464.3750		
4	J. Oberto	462.5250		
5	C. Hart	468.7250		
6	W. Rhodes	464.8250		
6	D. Elliott	462.3375		
7	R. Eaton	461.0250	462.6750	464.1250
8	J. MacDuffee	469.5875		
11	T. Sweatman	464.8500		
16	A. Newport	461.0125		
21	B. Lawrence	461.2500	461.1125	
22	D. Lusk	463.7250		
25	J. Dillon	460.5125		
32	R. Kusah	461.1125		
36	J. Tanner	462.2500		
39	P. Harding	461.6875	461.5375	461.7875
40	R. Suran	465.1875	462.2500	
42	R. Allison	467.1625	469.5875	
50	M. Shenyer	460.9250		
52	C. Bennett	463.7875		
55	E. Watson	463.6125		
58	J. Fink	469.5250		
61	K. Pope	467.7875		
62	B. Eastwood	460.6875		
63	M. Zehr	469.8250		
64	G. Evans	466.1000		
71	T. Carter	464.7250		
73	G. Lewis	463.8625		
78	J. Constance	457.0750	465.0375	466.2625
80	Vandenbilche	469.1250	468.1000	
81	M. Rosler	461.1250	466.1250	
86	H. Raczynski	464.9875		
88	W. Bruce	469.9250	457.5250	469.4125
92	K. Longley	464.6625		
95	J. Jefferson	469.6375		

04	C. Cunningham	467.8125	464.8125

Race Media:

ABC	455.8375
CBS	455.6500
CBS	450.8000
Diamond P Sports	463.2125
ESPN	455.4500
ESPN - Broadcast	450.3500
ESPN - Pit Spotters	154.9000
MRN	454.0000
Sports Channel America	455.5500
TNN	467.9000
TNN	467.7500
WTBS	450.1125
WTBS	455.4500

Race Tracks:

Charlotte Motor Speedway, NC		461.9000
		462.5500
		462.6500
		463.9000
Darlington Raceway, SC		464.7750
Daytona International Speedway, FL		464.7750
Evergreen Speedway, WA		151.7450
Flemington Speedway, NJ		151.6250
I-70 Speedway, KS		467.9250
Las Vegas Motor Speedway, NV		463.3000
Milwaukee Mile, WI		460.0750
Myrtle Beach Speedway, SC		464.5000
		464.9000
Portland Speedway, OR		467.5375
		461.5375
Richmond International Raceway, VA		464.5500
Road America, WI		464.3250
		469.3250
		464.0250
		150.8900
		151.6250
		464.3750
	Rescue	463.4250
Talladega Superspeedway, AL		464.7625
		464.7750
Watkins Glen International, NY		464.7750

Southwest Tour -- By Driver Number:

Car#	Driver	Main	Secondary	Additional
1	C. Raudman	463.4750	463.7625	
3	R. Revak	467.8750	469.8625	
3	H. Brady	461.9625		
4	D. Dyer	469.0250		

4	B. Bechtel	469.0250		
5	B. Bermone	464.8500	464.8500	469.2125
6	K. Boyd	468.0375		
7	F. Moronski	467.9125	466.4000	
8	R. Peterson	460.6875	464.4500	
9	F. Adamo	461.2750		
9	D. Renno	466.0625		
11	D. O'Donnell	468.6625		
11	R. Mears, Jr.	461.1750		
12	R. Allison	467.1625		
12	B. Yackey	461.2125		
13	R. Housewright	462.1125		
14	K. Hendrick	467.0375		
14	R. Crawford	462.6500	461.8750	
14	S. Portenga	464.1875		
15	D. Linger	465.6750		
17	J. Fensler	463.9500		
19	T. Toste	467.6875		
20	J. Inglebright	463.6875		
21	K. Pederson	468.0375		
21	E. Holmes	466.0875		
22	B. Dold	464.4125		
22	G. Pursley	464.4500		
22	B. Lawrence	461.1125	461.2500	
22	P. Perry	468.3375		
22	B. Hodge	464.4625		
23	T. McCarthy	464.5500		
24	J. Waters	466.3625		
25	S. Petty	462.4250		
26	K. Boyd	467.0375		
27	E. McGinnis	463.3250		
28	G. Biffle	463.5000		
28	J. Walsh	466.3500		
29	R. Neveau	469.6125		
30	T. Hubert	461.2375	464.0375	468.0375
31	E. Lashkoff	466.7625		
32	C. Shannon	466.3000		
34	D. McCoun	469.5750		
35	K. Richards	462.1625		
36	K. Beltnick	463.2750		
37	K. Spangler	461.9625	462.0625	
38	D. Adams	468.5500		
38	B. Gilliland	464.5875		
38	R. Miller	469.0500		
40	K. Shepherd	461.2875		
40	R. Suran	460.9750		
41	K. Gravburger	468.3750		
42	P. Patterson	469.2000		
43	D. Karst	466.5000		
44	B. Lyon	462.1125	467.4000	
45	K. Para	461.4875		
46	M. Crafton	466.2875	469.5125	
47	M. Brummit	469.3500		
47	B. Vollstedt	465.9750		
48	S. Monroe	461.0375	469.7625	
50	D. Byrd	464.3750		
51	B. Smart	462.0500		
54	F. Amado	463.8250		
55	M. McGarry	469.3625		
55	K. Harvick	469.1875		
56	B. Bell	467.8500	462.5750	

57	M. Wilson	461.2250		
58	P. Dube	468.7250	468.5625	
59	K. Mayberry	466.3375		
61	M. Alsup	460.7000	457.5750	
63	C. Billington	467.0375		
63	T. Beebe	467.0375		
64	M. Meech	469.4375		
65	D. Woolridge	461.1750		
65	J. Hill	466.0500		
66	J. Paques	465.9875	469.4375	
67	D. Olson	467.8625		
68	S. Teets	466.5500		
70	K. Bush	461.1625	461.0625	461.7625
71	J. Cain	466.2250		
72	M. Groskreutz	467.1625		
72	R. Laskowsky	464.8875		
73	M. Reed	468.8625		
74	S. Busby	462.4625		
74	B. Lesnett	466.8375	466.6875	
75	R. Gannon	464.7125		
76	E. Bryans	464.3875	464.8375	
77	D. Dyer	464.4500		
79	G. Smith	466.1750		
81	R. Avants	463.3125		
82	B. Hitner	467.9250		
82	R. Schuldt	466.8750		
82	D. Binstock	464.5500	462.6750	
85	M. McGarry	469.4500		
85	K. Richards	462.1625		
87	M. Ramsey	461.7375		
87	M. Kanke	461.6125	461.9250	
90	R. Strmiska	468.9750		
90	M. Shenyer	460.9250		
93	C. Raudman	464.0375		
95	K. Shepherd	468.8125		
98	E. Coughenour	464.4500	464.2750	
98	T. Ermish	469.8750		
98	D. Trick	463.9125		
99	D. Piz	469.9500		
00	J. Brazil	465.9500		
02	J. Bender	461.9625		
03	J. Pettit II	463.8875		
05	J. Metcalf	465.0000		
06	R. Lawson, Jr.	465.6000		

Winston Cup Cars -- By Driver Number:

Car#	Driver	Main	Secondary	Additional
1	Steve Park	466.2500	466.2250	
2	Rusty Wallace	461.5875	461.3375	469.0125
3	Dale Earnhardt	462.0250	463.2250	
4	Bobby Hamiton	461.7500	464.1750	467.9250
5	Terry Labonta	468.2125	469.4875	
6	Mark Martin	460.9500	466.0750	
7	Goff Bodin	457.3750	463.1750	457.7500
8		462.3000	466.0875	
9	Jerry Nadeau	464.1750	463.9750	
10	Ricky Rudd	465.7375	463.9375	

11	Brett Bodin	855.5125	855.4625	
12	Jeremy Mayfield	462.7125	461.2875	
13	Dennis Setzer	469.8750	468.6750	
14	Loy Allen	458.1625	466.1625	
15	Ted Musgrave	457.5250	457.5500	
16	Kevin Lepage	468.4500	463.4500	
18	Bobby Labonte	467.7625	466.0125	854.2875
21	Michael Waltrip	855.2875	854.0375	
22	Ward Burton	468.9375	462.8375	
23	Jim Spencer	469.8375	469.7625	
24	Jeff Gordon	467.0625	465.8625	
26	Johnny Benson Jr.	469.0250	461.7375	465.0250
				466.7250
27	Tom Kendall	466.2500		
28	Kenny Irwin Jr.	466.9500	466.4500	
29	Jeff Green	467.9625	466.4625	
30	Derrike Cope	466.3000	469.0000	
31	Mike Skinner	468.2500	468.6000	462.1250
				466.9250
33	Ken Schrader	466.7375	468.7750	
35	Darrell Waltrip	467.2125	468.1125	
36	Erin Irvan	463.2875	467.0375	
40	Sterling Marlin	461.0000	468.7000	463.9625
				460.9750
41	Steve Grissom	459.3625	460.0125	461.5625
				461.0000
42	Joe Nemechek	460.9750	468.7000	
43	John Andretti	468.3000	468.5500	852.1875
44	Kyle Petty	469.8000	469.3000	457.5500
46	Jeff Green	460.2375	468.8375	
47	Standridge	469.0375	469.0875	
50	Dallenbach	466.7875		
55		468.7750		
59	Mark Gibson	467.7000	462.2000	
71	Dave Marcis	467.5625		
73	Mike Wallace	467.8250	467.7750	463.9750
75	Rick Mast	468.9750	461.9375	
77	Robert Pressley	468.8875	463.8875	
78	Gary Bradberry	451.1875	463.9125	
81	Kenny Walace	459.3875	459.6875	461.5625
84	Benning	464.9875		
88	Dale Jarrett	468.5250	466.3750	
90	Dick Trickle	467.1625	461.5375	
91		460.6875	468.1875	
92	Elliott Sadler	467.9625		
94	Bill Elliott	460.0875	466.4875	
95	Andy Hillenburg	463.5000	460.0175	
96	Steve Grissom	464.8875	460.7625	
97	Chad Little	460.6625	463.4250	
98	Rich Bickle	468.7250	469.1500	
99	Jeff Burton	466.2750	466.8625	
05	Mongen Shephard	459.5125		
00	Buckshot Jones	452.3000	465.8875	466.0875

Winston West

Car#	Driver	Main	Secondary	Additional
1	B. Gilliand	464.4500		

2	C. Raudman	463.4750	
3	J. Sauter	462.1250	
4	J. Davis	468.6125	
6	P. Pryor	461.6750	468.2625
10	T. Toste	465.7250	467.6875
12	A. Cameron	466.5625	
13	S. Almquist	461.1750	
14	J. Small	460.7125	
15	R. Scribner	461.4875	466.4875
16	G. Smith	469.8750	
18	B. Carpenter	467.2125	
19	B. Kahn	466.1125	462.1500
20	B. Gaughan	461.6500	
23	B. Ash	461.1250	463.2500
26	R. Burns	469.2875	469.8750
28	G. Collins	465.7625	
32	E. Norris	468.7125	
33	D. Krentz	462.5750	
34	T. Clark	466.8625	
40	K. Tanner	467.8500	
43	B. Bechtel	467.2125	
47	N. Alsup	469.9000	
50	B. Bechtel	469.0250	
55	B. Lemler	468.5625	
57	D. Linger	465.6750	
60	L. Norrick	464.4125	468.4125
69	B. Aiken	457.5750	460.6625
71	J. Cain	468.5875	466.2250
75	K. Harvick	457.8125	460.9125
81	J. Glanville	468.8250	466.5750
82	R. Nelson	464.2625	468.9625
85	K. Richards	462.1625	
86	R. Woodland	461.9375	
88	J. Streeter	468.6625	466.9875
89	W. Jacks	461.0500	468.0500
99	D. Piz	466.0125	469.9500
00	S. Gaylord	466.2500	463.6625
02	B. Howard	463.3750	
07	S. Woodside	460.9875	462.0250
08	M. Nakaji	464.6000	465.7625
09	G. Smith	462.7000	464.6000

Racing Media Frequencies:

ESPN	450.3500	468.7375
MRN Radio	454.0000	
PRN Radio	454.0000	
TNN	467.7000	467.7500

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Sporting Venues

Action Park Incorporated	151.8950
Action Park Incorporated	154.5700
Action Park Incorporated	154.6000
ARA Leisure Services (Arlington, TX)	464.5625
ARA Services, Incorporated (Houston, TX)	154.6000
Astrodome, USA	461.1375

Astrodome, USA	461.7125
Astrodome, USA	461.7375
Astrodome, USA	461.9500
Astrodome, USA	462.0250
Astrodome, USA	462.0750
Astrodome, USA	462.1375
Astrodome, USA	463.3000
Astrodome, USA	463.8375
Astrodome, USA	463.9375
Astrodome, USA	464.4125
Astrodome, USA	464.9375
Atlantic City Racing Association (Paging)	158.4600
Atlantic City Racing Association	464.5250
Baltusrol Golf Club	464.4750
Basking Ridge Golf Course	461.5875
Beaver Brook Country Club	151.6250
Brooklake Country Club	151.8650
California Stadium Services (Candlestick Park)	966.6375
California Stadium Services (Candlestick Park)	966.6375
Cleveland Stadium Corporation	154.5700
DSP Racing	469.6250
Ellis Race & Entertainment Center (Henderson, KY)	464.6750
Fairmont Country Club	154.6000
Forest Hill Field Club	154.6000
Frank Stinson Motorsports	464.9625
Freehold Racing Association	464.3375
Glen Ridge Country Club	151.8950
Glen Ridge Country Club	151.9550
Great Adventure	154.5400
Great Adventure	154.6000
Great Adventure	462.7250
Great Adventure	464.3250
Great Adventure	464.4250
Great Adventure	464.6750
Great Adventure	464.8250
Great Adventure	464.9750
Great American Recreation Corp.	151.6850
Great American Recreation Corp.	151.7150
Great American Recreation Corp.	463.4500
Great American Recreation Corp.	464.9750
Harry M. Stevens Corp. (Houston, TX)	151.6250
Harry M. Stevens Corp. (Houston, TX)	151.9250
Harry M. Stevens Corp. (Houston, TX)	464.5000
Harry M. Stevens Corp. (Houston, TX)	464.6750
Harry M. Stevens Corp. (Meadowlands)	151.7750
Harry M. Stevens Corp. (Meadowlands)	151.9550
Hunterdon Ballooning Inc.	154.5150
Knoll Country Club	464.5125
Little Mill Country Club	151.8950
Loesch Racing	461.4125
Metropolitan Sports Center (Minneapolis, MN)	154.5700
Monmouth Park Raceway	154.5150
Monmouth Park Raceway	155.9850
Monmouth Park Raceway	453.0125
Monmouth Park Raceway	464.8250
Montclair Country Club	464.1875
Mountain Ridge Country Club	469.9250
New Jersey Sports And Exposition Authority	477.1375
New Jersey Sports And Exposition Authority	860.2625
New York Giants	154.5400
New York Giants	464.7750

Ogden Services (Cincinnati, OH)	462.9250
Panther Valley Golf & Country Club	154.5700
Pine Barrens Canoe	151.9550
Point Pleasant Canoe	461.8750
Pontiac Stadium Authority	462.1625
Preakness Hills Country Club	151.8350
Preakness Hills Country Club	151.8950
Ridgewood Country Club	151.6850
Ridgewood Country Club	463.7750
Seaview Country Club	154.6000
Skydive Inc.	154.5400
Spectator Systems, Incorporated	464.5500
Spectator Systems, Incorporated	469.5500
Spectator Systems, Incorporated	469.5000
Spectrum, Incorporated	464.2750
Spectrum, Incorporated	464.9500
Sports Park USA Inc.	463.4500
Sportsworld	154.6000
Suburban Golf Course	461.3375
Tamcrest Country Club	469.7750
Tavistock Country Club	154.5700
Tavistock Country Club	154.6000
United States Golf Association	154.5400
Vernon Valley Recreation Association	151.9250
Westwood Golf Club	151.9550
White Beeches Country Club	461.1750
Wing Stadium Management (Kalamazoo, MI)	151.8350

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Weather Forecasts

Note: Look at the power rating of the stations. The more power the further away they can be heard. Generally you can hear a weather station in a 25 - 35 mile radius of the transmitter.

United States NOAA Radio Frequencies

Location	State	Call	Frequency	Watts
Alabama				
Anniston	AL	KIH58	162.475	1000
Auburn	AL	WWF54	162.525	1000
Birmingham	AL	KIH54	162.550	1000
Cullman	AL	WWF66	162.450	100
Demopolis	AL	WXL72	162.475	1000
Dozier	AL	KIH59	162.550	800
Florence	AL	KIH57	162.475	1000
Fort Payne	AL	WWF44	162.500	1000
Huntsville	AL	KIH20	162.400	1000
Jackson	AL	WWF55	162.500	1000
Louisville	AL	KIH56	162.475	1000
Mobile	AL	KEC61	162.550	1000
Montgomery	AL	KIH55	162.400	1000
Tuscaloosa	AL	KIH60	162.400	1000
Winfield	AL	WWF53	162.525	1000
Alaska				
Anchorage	AK	KEC43	162.550	125
Cordova	AK	WXJ79	162.400	500
Craig	AK	WXJ26A	162.475	125

Fairbanks	AK	WXJ81	162.550	500
Haines	AK	WXM97	162.400	100
Homer	AK	WXJ24	162.400	800
Juneau	AK	WXJ25	162.550	500
Ketchikan	AK	WXJ26	162.550	500
Kodiak	AK	WXJ78	162.550	100
Nome	AK	WXJ62	162.550	500
Seward	AK	KEC81	162.550	330
Sitka	AK	WXJ80	162.550	200
Soldotna	AK	WWG39	162.475	300
Valdez	AK	WXJ63	162.550	500
Wrangell	AK	WXJ83	162.400	750
Yakutat	AK	WXK69	162.400	1000
Arizona				
Flagstaff	AZ	WXK76	162.400	100
Gila Co. No.	AZ	WWG41	162.425	100
Gila Co. So.	AZ	WWG42	162.500	100
Grand Canyon	AZ	WWF52	162.475	100
Phoenix	AZ	KEC94	162.550	300
Prescott	AZ	WWF98	162.525	100
Show Low	AZ	WXK76A	162.400	100
Tucson	AZ	WXL30	162.400	100
Window Rock	AZ	WWF99	162.550	100
Yuma	AZ	WXL87	162.550	100
Arkansas				
Fayetteville	AR	WXJ52	162.475	1000
Fort Smith	AR	WXJ50	162.550	1000
Gurdon	AR	WXJ48	162.475	1000
Jonesboro	AR	WXJ51	162.550	1000
Little Rock	AR	WXJ55	162.550	1000
Mountain View	AR	WXL66	162.400	1000
Russellville	AR	WWF96	162.525	1000
Star City	AR	WXJ54	162.400	1000
Texarkana	AR	WXJ49	162.550	1000
California				
Bakersfield	CA	WXL89	162.550	100
Coachella	CA	KIG78	162.400	100
Eureka	CA	KEC82	162.400	330
Fresno	CA	KIH62	162.400	330
Grass Valley	CA	WWF67	162.400	100
Los Angeles	CA	KWO37	162.550	500
Monterey	CA	KEC49	162.550	100
Monterey Mar.	CA	WWF64	162.450	100
Pt Arena/Ukiah	CA	KIH30	162.550	500
Redding	CA	WXL88	162.550	100
Sacramento	CA	KEC57	162.550	330
San Diego	CA	KEC62	162.400	330
San Francisco	CA	KHB49	162.400	500
San Luis Obis.	CA	KIH31	162.550	330
Santa Ana	CA	WWG21	162.450	100
Santa Barbara	CA	WWF62	162.475	100
Santa Barbara	CA	KIH34	162.400	330
Colorado				
Alamosa	CO	WXM54	162.475	100
Bethune	CO	WWF77	162.525	100
Colorado Spg.	CO	WXM56	162.475	100
Denver	CO	KEC76	162.550	330

Fort Collins	CO	WXM92	162.450	100
Glenwood Spg.	CO	WWG43	162.500	100
Grand Junction	CO	WXM55	162.550	300
Greeley	CO	WXM50	162.400	100
La Junta	CO	WWG23	162.500	100
Mead/Longmount	CO	WXM51	162.475	100
Pueblo	CO	WXM52	162.400	100
Sterling	CO	WXM53	162.400	300
Connecticut				
Hartford	CT	WXJ41	162.475	300
Meriden	CT	WXJ42	162.400	500
New London	CT	KHB47	162.550	500
Delaware				
Lewes	DE	WXJ94	162.550	500
District of Columbua				
Washington	DC	KHB36	162.550	1000
Florida				
Belle Glade	FL	WXM58	162.400	300
Daytona Beach	FL	KIH26	162.400	1000
East Point	FL	WWF86	162.500	250
Fort Myers	FL	WXK83	162.475	1000
Fort Pierce	FL	WWF69	162.425	100
Gainesville	FL	WXJ60	162.475	1000
Inverness	FL	WWF38	162.400	350
Jacksonville	FL	KHB39	162.550	1000
Key West	FL	WXJ95	162.400	1000
Live Oak	FL	WWG30	162.450	300
Melbourne	FL	WXJ70	162.550	1000
Miami	FL	KHB34	162.550	1000
Ocala	FL	WWF85	162.525	250
Orlando	FL	KIH63	162.475	1000
Panama City	FL	KGG67	162.550	1000
Pensacola	FL	KEC86	162.400	500
Salem	FL	WWF88	162.425	1000
Sebring	FL	WXK83A	162.500	110
Tallahassee	FL	KIH24	162.400	1000
Tampa	FL	KHB32	162.550	1000
West Palm Bch	FL	KEC50	162.475	500
Georgia				
Athens	GA	WXK56	162.400	500
Atlanta	GA	KEC80	162.550	500
Augusta	GA	WXK54	162.550	500
Baxley	GA	WXM65	162.525	350
Chatsworth	GA	WXK52	162.400	200
Columbus	GA	WXM32	162.400	1000
Macon	GA	WXK71	162.475	1000
Pelham	GA	WXK53	162.550	500
Savannah	GA	KEC85	162.400	1000
Valdosta	GA	WXM79	162.500	100
Waycross	GA	WXK75	162.475	500
Waynesboro	GA	WXM88	162.425	375
Hawaii				
Kauai	HI	KBA99	162.400	1000
Kulani Cone	HI	KBA99	162.550	1000
Maui	HI	KBA99	162.400	1000

Mount Kaala	HI	KBA99	162.550	1000
Oahu Kai	HI	WWF39	162.400	10
South Point	HI	WWG27	162.550	150
Idaho				
Boise	ID	WXK68	162.550	100
Lewiston	ID	WXK98	162.550	100
Mccall	ID	WWF58	162.475	100
Pocatello	ID	WXL33	162.550	100
Twin Falls	ID	WXL35	162.400	100
Illinois				
Champaign	IL	WXJ76	162.550	1000
Chicago	IL	KWO39	162.550	500
Marion	IL	WXM49	162.425	1000
Peoria	IL	WXJ71	162.475	1000
Rock Island	IL	WXJ73	162.550	1000
Rockford	IL	WXJ74	162.475	1000
Springfield	IL	WXJ75	162.400	1000
Indiana				
Bloomington	IN	WXM78	162.450	1000
Evansville	IN	KIG76	162.550	1000
Fort Wayne	IN	WXJ58	162.550	1000
Indianapolis	IN	KEC74	162.550	1000
Lafayette	IN	WXK74	162.475	1000
Marion	IN	WXM98	162.450	400
North Webster	IN	WWG45	162.450	1000
Putnamville	IN	WXK72	162.400	1000
South Bend	IN	WXJ57	162.400	1000
Iowa				
Cedar Rapids	IA	WXL61	162.475	1000
Des Moines	IA	WXL57	162.550	1000
Dubuque	IA	WXL64	162.400	1000
Sioux City	IA	WXL62	162.475	1000
Waterloo	IA	WXL94	162.550	1000
Kansas				
Chanute	KS	WXK95	162.400	1000
Colby/Goodland	KS	WXK96	162.400	600
Concordia	KS	WXK94	162.550	1000
Dodge City	KS	WXK93	162.475	1000
Ellsworth	KS	WXK92	162.400	1000
Lenora	KS	WWF87	162.425	100
Topeka	KS	WXK91	162.475	1000
Tribune	KS	WWG22	162.550	150
Wichita	KS	KEC59	162.550	1000
Kentucky				
Ashland	KY	KIH39	162.550	1000
Bowling Green	KY	KIH45	162.400	1000
Covington	KY	KIH42	162.550	1000
Elizabethtown	KY	KIH43A	162.550	100
Hazard	KY	KIH40	162.475	1000
Jackson	KY	WWG26	162.425	100
Lexington	KY	KIH41	162.400	1000
Louisville	KY	KIH43	162.475	1000
Madison	KY	WWF82	162.525	100
Mayfield	KY	KIH46	162.475	1000
Paintsville	KY	WWG28	162.525	100

Pikeville	KY	WWG29	162.400	100
Somerset	KY	KIH44	162.550	1000
Louisiana				
Alexandria	LA	WXK78	162.475	1000
Baton Rouge	LA	KHB46	162.400	700
Buras	LA	WXL41	162.475	1000
Lafayette	LA	WXK80	162.550	1000
Lake Charles	LA	KHB42	162.400	500
Monroe	LA	WXJ96	162.550	1000
Morgan City	LA	KIH23	162.475	1000
New Orleans	LA	KHB43	162.550	1000
Shreveport	LA	WXJ97	162.400	1000
Maine				
Caribou	ME	WXM77	162.525	500
Dresden	ME	WXM60	162.475	100
Ellsworth	ME	KEC93	162.400	1000
Falmouth	ME	KDO95	162.550	500
Mariana Islands				
Guam	GU	WXM85	162.4000	
Saipan		WXM86	162.5500	
Maryland				
Baltimore	MD	KEC83	162.400	1000
Hagerstown	MD	WXM42	162.475	1000
Salisbury	MD	KEC92	162.475	1000
Massachusetts				
Boston	MA	KHB35	162.475	500
Hyannis	MA	KEC73	162.550	1000
Mt. Greylock	MA	WWF48	162.525	100
Worcester	MA	WXL93	162.550	500
Michigan				
Alpena	MI	KIG83	162.550	500
Detroit	MI	KEC63	162.550	330
Flint	MI	KIH29	162.475	1000
Gaylord	MI	WWF70	162.500	100
Grand Rapids	MI	KIG63	162.550	1000
Hesperia	MI	WWF36	162.475	150
Houghton	MI	WXK73	162.400	1000
Marquette	MI	KIG66	162.550	300
Onondaga	MI	WXK81	162.400	500
Oshtemo	MI	WWF34	162.475	500
Sault St Marie	MI	KIG74	162.550	1000
Traverse City	MI	KIH22	162.400	330
Minnesota				
Bemidji	MN	WXM99	162.425	110
Detroit Lakes	MN	WXM64	162.400	100
Duluth	MN	KIG64	162.550	1000
Intl Falls	MN	WXK45	162.550	1000
Mankato	MN	WXK40	162.400	1000
Minneapolis	MN	KEC65	162.550	1000
Rochester	MN	WXK41	162.475	1000
Roosevelt	MN	WWF45	162.450	190
St. Cloud	MN	WXL65	162 475	100
Thief Rvr Fall	MN	WXK43	162.550	1000
Willmar	MN	WXK44	162.475	1000

Mississippi				
Ackerman	MS	KIH51	162.475	300
Booneville	MS	KIH53	162.550	700
Bude	MS	KIH48	162.550	400
Columbia	MS	WXL21	162.400	30
Gulfport	MS	KIH21	162.400	1000
Hattiesburg	MS	KIH47	162.475	1000
Inverness	MS	KIH50	162.550	500
Jackson	MS	KIH38	162.400	800
Kosciusko	MS	WWG38	162.425	300
Meridian	MS	KIH49	162.550	500
Oxford	MS	KIH52	162.400	400
Parchman	MS	WWG37	162.500	100
Missouri				
Bourbon	MO	WWF75	162.525	1000
Camdenton	MO	WXJ90	162.550	1000
Columbia	MO	WXL45	162.400	1000
Hannibal	MO	WXK82	162.475	1000
Hermitage	MO	WXM81	162.450	100
Joplin	MO	WXJ61	162.425	1000
Kansas City	MO	KID77	162.550	1000
Sikeston	MO	WXL47	162.400	1000
Springfield	MO	WXL46	162.400	1000
Saint Joseph	MO	KEC77	162.400	1000
Saint Louis	MO	KDO89	162.550	1000
Summersville	MO	WWF76	162.475	1000
Montana				
Billings	MT	WXL27	162.550	300
Butte	MT	WXL79	162.550	100
Glasgow	MT	WXL32	162.400	300
Glendive	MT	WWF93	162.475	100
Great Falls	MT	WXJ43	162.550	300
Havre	MT	WXL53	162.400	300
Helena	MT	WXK66	162.400	300
Kalispell	MT	WXL82	162.550	100
Miles City	MT	WXL54	162.400	300
Missoula	MT	WXL25	162.400	100
Plentywood	MT	WWF50	162.475	50
Scoby	MT	WWF92	162.450	25
Nebraska				
Bassett	NE	WXL73	162.475	630
Grand Island	NE	WXL74	162.400	1000
Holdrege	NE	WXL75	162.475	1000
Lincoln	NE	WXM20	162.475	1000
Merriman	NE	WXL76	162.400	800
Norfolk	NE	WXL77	162.550	800
North Platte	NE	WXL68	162.550	1000
Omaha	NE	KIH61	162.400	1000
Scottsbluff	NE	WXL67	162.550	1000
Nevada				
Elko	NV	WXL28	162.550	100
Ely	NV	WXL69	162.400	100
Eureka	NV	WWF81	162.550	100
Hawthorne	NV	WWF59	162.475	100
Las Vegas	NV	WXL36	162.550	100
Northwest NV	NV	WWG20	162.450	100

Reno	NV	WXK58	162.550	100
Winnemucca	NV	WXL29	162.400	100
New Hampshire				
Concord	NH	WXJ40	162.400	330
New Jersey				
Atlantic City	NJ	KHB38	162.400	1000
New Mexico				
Albuquerque	NM	WXJ34	162.400	100
Carlsbad	NM	WWF37	162.475	100
Clovis	NM	WXJ35	162.475	100
Des Moines	NM	WXL90	162.550	100
Farmington	NM	WXJ37	162.475	100
Hobbs	NM	WXJ36	162.400	100
Las Cruces	NM	WXL91	162.400	100
Roswell	NM	WWG36	162.450	100
Ruidoso	NM	WXJ38	162.550	100
Santa Fe	NM	WXJ33	162.550	100
New York				
Albany	NY	WXL34	162.550	1000
Binghamton	NY	WXL38	162.475	1000
Buffalo	NY	KEB98	162.550	330
Elmira	NY	WXM31	162.400	1000
Kingston	NY	WXL37	162.475	1000
Little Valley	NY	WWG3Z	162.425	100
New York City	NY	KWO35	162.550	500
Riverhead	NY	WXM80	162.475	1000
Rochester	NY	KHA53	162.400	500
Stamford	NY	WWF43	162.400	60
Syracuse	NY	WXL31	162.550	1000
Watertown	NY	WXN68	162.475	100
North Carolina				
Asheville	NC	WXL56	162.400	250
Badin	NC	WWF60	162.425	1000
Cape Hatteras	NC	KIG77	162.475	1000
Charlotte	NC	WXL70	162.475	200
Fayetteville	NC	WXL50	162.475	250
Lumber Bridge	NC	WWF89	162.525	100
Margaretsville	NC	WWG33	162.450	100
New Bern	NC	KEC84	162.400	1000
Raleigh/Durham	NC	WXL58	162.550	1000
Rocky Mount	NC	WXL59	162.475	1000
Wilmington	NC	KHB31	162.550	1000
Winston-Salem	NC	WXL42	162.400	100
North Dakota				
Bismarck	ND	WXL78	162.475	1000
Devils Lake	ND	WWG25	162.425	100
Dickinson	ND	WXL80	162.400	800
Fargo	ND	WXK42	162.475	500
Grand Forks	ND	WWF83	162.475	50
Jamestown	ND	WXL81	162.550	1000
Minot	ND	WXL83	162.400	1000
Petersburg	ND	WXM38	162.400	1000
Williston	ND	WXL84	162.550	1000
Ohio				

Akron	OH	KDO94	162.400	500
Bridgeport	OH	WWF35	162.525	1000
Cleveland	OH	KHB59	162.550	500
Columbus	OH	KIG86	162.550	1000
Dayton	OH	WXJ46	162.475	1000
High Hill	OH	WXJ47	162.475	1000
Lima	OH	WXJ93	162.400	1000
Sandusky	OH	KHB97	162.400	1000
Toledo	OH	WXL51	162.550	100
Oklahoma				
Clinton	OK	WXK87	162.475	500
Enid	OK	WXL48	162.475	200
Lawton	OK	WXK86	162.550	1000
Mcalester	OK	WXL49	162.475	1000
Oklahoma City	OK	WXK85	162.400	1000
Ponca City	OK	WWF42	162.450	500
Tulsa	OK	KIH27	162.550	500
Woodward	OK	WWG46	162.500	500
Oregon				
Astoria	OR	KEC91	162.400	100
Bend/Redmond	OR	WWF80	162.500	120
Brookings	OR	KIH37	162.550	500
Coos Bay	OR	KIH32	162.400	330
Eugene	OR	KEC42	162.400	100
Klamath Falls	OR	WXL97	162.550	100
Medford	OR	WXL85	162.400	330
Mt.Ashland	OR	WWF97	162.475	100
Nehalem	OR	WWF94	162.425	25
Newport	OR	KIH33	162.550	100
Pendleton	OR	WXL95	162.400	330
Portland	OR	KIG98	162.550	330
Roseburg	OR	WXL98	162.550	100
Salem	OR	WXL96	162.475	100
Tillamook	OR	WWF95	162.475	25
Umatillla	OR	WWF57	162.500	100
Pennsylvania				
Allentown	PA	WXL39	162.400	1000
Clearfield	PA	WXL52	162.550	500
Erie	PA	KEC58	162.400	330
Harrisburg	PA	WXL40	162.550	1000
Johnstown	PA	WXM33	162.400	250
Philadelphia	PA	KIH28	162.475	1000
Pittsburgh	PA	KIH35	162.550	1000
State College	PA	WXM59	162.475	100
Towanda	PA	WXM95	162.550	1000
Warren	PA	WWG51	162.450	1000
Wellsboro	PA	WXM94	162.475	1000
Wilkes-Barre	PA	WXL43	162.550	250
Williamsport	PA	WXL55	162.400	1000
Puerto Rico				
Maricao	PR	WXJ69	162.550	
San Juan	PR	WXJ69	162.400	
Rhode Island				
Providence	RI	WXJ39	162.400	500
South Carolina				

Beaufort	SC	WXJ23	162.475	350
Charleston	SC	KHB29	162.550	1000
Columbia	SC	WXJ20	162.400	1000
Conway	SC	KEC95	162.400	1000
Cross	SC	WXM93	162.475	100
Florence	SC	WXJ22	162.550	1000
Greenville	SC	WXJ21	162.550	1000
Sumter	SC	WXJ20	162.475	10
South Dakota				
Aberdeen	SD	WXM25	162.475	1000
Huron	SD	WXM27	162.550	500
Pierre	SD	WXM26	162.400	700
Rapid City	SD	WXM63	162.550	1000
Sioux Falls	SD	WXM28	162.400	1000
Tennessee				
Bristol	TN	WXK47	162.550	500
Chattanooga	TN	WXK48	162.550	1000
Cookeville	TN	WXK61	162.400	200
Jackson	TN	WXK60	162.550	1000
Knoxville	TN	WXK46	162.475	1000
Lawrenceburg	TN	WWF84	162.425	1000
Memphis	TN	WXK49	162.475	1000
Nashville	TN	KIG79	162.550	1000
Shelbyville	TN	WXK63	162.475	200
Waverly	TN	WXK62	162.400	1000
Texas				
Abilene	TX	WXK29	162.400	1000
Amarillo	TX	WXK38	162.550	1000
Austin	TX	WXK27	162.400	1000
Bay City	TX	WWG40	162.425	1000
Beaumont	TX	WXK28	162.475	1000
Big Spring	TX	WXK37	162.475	1000
Brownsville	TX	WWG34	162.550	1000
Bryan	TX	WXK30	162.550	1000
Corpus Christi	TX	KHB41	162.550	100
Dallas	TX	KEC56	162.400	1000
Del Rio	TX	WXJ98	162.400	1000
El Paso	TX	WXK25	162.475	100
Ft. Worth	TX	KEC55	162.550	1000
Galveston	TX	KHB40	162.550	500
Houston	TX	KGG68	162.400	330
Kerrville	TX	WWF90	162.450	1000
La Grange	TX	WW655	162.500	1000
Laredo	TX	WXK26	162.475	1000
Llano	TX	WWF91	162.425	1000
Lubbock	TX	WXK79	162.400	1000
Lufkin	TX	WXK23	162.550	1000
Odessa/Midland	TX	WXK32	162.400	1000
Paris	TX	WXK20	162.550	1000
Pharr	TX	KHB33	162.400	1000
San Angelo	TX	WXK33	162.550	1000
San Antonio	TX	WXK67	162.55	1000
Sherman	TX	WXK22	162.475	1000
Tyler	TX	WXK36	162.475	1000
Victoria	TX	WXK34	162.400	1000
Waco	TX	WXK35	162.475	1000
Wichita Falls	TX	WXK31	162.475	1000

Utah				
Lake Powell	UT	WXM89	162.550	100
Logan	UT	WXM22	162.400	100
Milford	UT	WXM24	162.400	100
Salt Lake City	UT	KEC78	162.550	330
St. George	UT	WWF51	162.475	100
Tooele South	UT	WWF46	162.450	100
Vernon Hills	UT	WWF47	162.525	100
Vernal	UT	WXM23	162.400	100
Vermont				
Burlington	VT	KIG60	162.400	1000
Marlboro	VT	WXM68	162.425	300
Windsor	VT	WXM44	162.475	400
Virgin Islands				
St. Thomas	VI		162.475	
Virginia				
Heathsville	VA	WXM57	162.400	1000
Lynchburg	VA	WXL92	162.550	1000
Norfolk	VA	KHB37	162.550	1000
Richmond	VA	WXK65	162.475	1000
Roanoke	VA	WXL60	162.475	1000
Washington				
Neah Bay	WA	KIH36	162.550	330
Okanagan	WA	WWF49	162.525	50
Olympia	WA	WXM62	162.475	100
Port Angeles	WA	WWG24	162.425	90
Richland	WA	WWF56	162.450	100
Seattle	WA	KHB60	162.550	330
Spokane	WA	WXL86	162.400	100
Wenatchee	WA	WXM48	162.475	100
Yakima	WA	KIG75	162.550	300
West Virginia				
Beckley	WV	WXM71	162.550	400
Charleston	WV	WXJ84	162.400	1000
Clarksburg	WV	WXJ85	162.550	1000
Gilbert	WV	WXM75	162.475	100
Hinton	WV	WXM72	162.425	1000
Moorefield	WV	WXM73	162.400	1000
Spencer	WV	WXM70	162.500	500
Sutton	WV	WXM74	162.450	1000
Wisconsin				
Adams	WI	WWF40	162.400	300
Green Bay	WI	KIG65	162.550	1000
La Crosse	WI	WXJ86	162.550	1000
Madison	WI	WXJ87	162.550	1000
Menomonie	WI	WXJ88	162.400	1000
Milwaukee	WI	KEC60	162.400	1000
Park Falls	WI	WXM91	162.500	500
Sister Bay	WI	WXN69	162.425	500
Wausau	WI	WXJ89	162.475	100
Wyoming				
Casper	WY	WXM47	162.550	400
Cheyenne	WY	WXM37	162.475	1000
Lander	WY	WXM61	162.475	1000

Sheridan	WY	WXM46	162.475	400

Weatheradio Canada

Location	Province	Call	Frequency
Alberta			
Calgary	AB	XLF339	162.400
Edmonton	AB	XOF962	162.475
Edmonton East	AB	XLM572	162.400
Lethbridge	AB	XKA598	162.400
British Columbia			
Aldergrove	BC	XLA852	162.550
Alert Bay	BC	VAS6	162.550
Barry Inlet	BC	XLK897	162.400
Bowen Island	BC	XLK672	162.475
Cape Lazo	BC	VAC	162.550
Chumshwa	BC	XLK894	162.475
Duncan	BC	XLA680	162.400
Duncan	BC	XLA680	162.550
Dundas Island	BC	VGL22	162.400
Elza Dome	BC	VGL57	162.550
Klemtu	BC	XLK899	162.550
Mt. Buston	BC	VGL24	162.400
Mt. Gil	BC	XLK898	162.400
Mt. Hemken	BC	XLA726	162.475
Mt. Ozzar	BC	XLK694	162.400
Mt. Tuam	BC	CFA240	162.400
Mt. Val	BC	XLR295	162.550
Naden Harbour	BC	XLK895	162.400
Nootka	BC	VGZ36	162.400
Pt. Alberni	BC	XLA823	162.400
Van Inlet	BC	XLK896	162.550
Manitoba			
Riverton	MB	XLF471	162.400
St. Norbert	MB	XLM538	162.550
New Brunswick			
Bethel	NB	XLM490	162.400
Bethel	NB	XLM490	162.475
Crabbie Mtn.	NB	XLM404	162.400
Crabbie Mtn.	NB	XLM404	162.550
Dalhousie	NB	XLK418	162.550
Miscou Island	NB	XMQ533	162.400
Miscou Island	NB	XMQ533	162.550
Moncton	NB	XLM566	162.550
Poplar Hill	NB	VCF757	162.475
Scotch Mtn.	NB	XLM403	162.400
Scotch Mtn.	NB	XLM403	162.550
St. Andre	NB	XKJ325	162.550
St. Isidore	NB	XLK471	162.400
Newfoundland			
Birchy Lake	NF	XLM665	162.400
Botwood	NF	XLM664	162.550
Brents Cove	NF	XLW297	162.400
Codroy Pond	NF	XLW201	162.400
Conche	NF	XLW296	162.550

Daniels Harbor	NF	XLW298	162.400
Gander	NF	XLM616	162.400
Hermitage	NF	XLW204	162.550
Kenmont Hill	NF	XLM614	162.400
Marystown	NF	XLM683	162.400
Mt. Margaret	NF	XLW295	162.550
Pt. Rexton	NF	XLM615	162.550
Rose Blanche	NF	XLW202	162.550
St. Anthony	NF	XLW299	162.400
Trepassey	NF	XLM662	162.550
Watsons Brook	NF	XLW200	162.550
Nova Scotia			
Aylesford	NS	XLK497	162.550
Bakers Settl.	NS	XLK409	162.400
Ben Edikn	NS	XLW262	162.475
Cape North	NS	XLM667	162.550
Cheticamp	NS	XLW263	162.475
Geizers Hill	NS	XLK473	162.550
Hebron	NS	XLW573	162.550
Melrose	NS	XLK499	162.400
New Tusket	NS	XLK496	162.550
Nubby Mtn.	NS	XLK498	162.400
Oak Park	NS	XLW502	162.475
River Denys	NS	XLK445	162.550
Shelburne	NS	XLK410	162.550
Victoria Jct.	NS	XLK444	162.400
Ontario			
Aylmer	ON	XLJ892	162.475
Blue Mountain	ON	XMJ316	162.400
Camp Fortune	ON	XLJ696	162.400
Colborne	ON	XLT839	162.400
Colborne	ON	XLT839	162.475
Harwood	ON	VUE671	162.550
Kenora	ON	XLJ890	162.475
Kingston	ON	XJV363	162.475
Little Current	ON	XMJ475	162.475
MacGregor Twp.	ON	XMJ838	162.475
North Bay	ON	XLJ893	162.475
Oil Springs	ON	XJV492	162.400
Pt. Elgin	ON	XMJ320	162.550
Sault St Marie	ON	XMJ373	162.400
Thunder Bay	ON	XJJ374	162.475
Toronto	ON	XMJ225	162.475
Windsor	ON		162.475
Prince Edward Island			
Bear River	PE	XLK644	162.400
Hazel Grove	PE	XLM647	162.400
Cleary	PE	XLK645	162.475
Cleary	PE	XLK645	162.550
Quebec			
Baie Johan Be	PQ	XLR529	162.400
Blanc Sadlon	PQ	XLR526	162.400
Camp Fortune	PQ	XLJ696	162.400
Cap Des La Ma	PQ	XLR525	162.475
Chicotmi	PQ	XLR285	162.550
Fleurmont	PQ		162.475
Harrington	PQ	XLR606	162.550

Mt. Belar	PQ	XLM369	162.550
Mt. Carmel	PQ	XLR411	162.400
Mt. Comi	PQ		162.400
Mt. Grand Fon	PQ	XLR611	162.475
Mt. Orford	PQ	XLR412	162.475
Mt. Royal	PQ	XLM300	162.550
Mt. St. Margu	PQ	XLR527	162.400
Mt. Valn	PQ	XLR285	162.550
Pt. Noire	PQ	XLR519	162.550
Rimouski	PQ	XLR617	162.550
St Cleophase	PQ	XLR528	162.400
Saskatchewan			
Lumsden	SK	XLM537	162.550
Saskatoon	SK	XLF322	162.550
Stranraer	SK		162.400
Swift Current	SK		162.550

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Eastern

Legend
Destination served by Delta
Destination served by Delta Connection Carrier
Destination served by Delta and Delta Connection Carrier
Destination served by Delta, Delta Connection Carrier, and Delta Codeshare Partners
Bangor
Burlington
Portland
Manchester
Boston
Albany
Worcester
Rochester
Syracuse
Providence
Nantucket Island
Hartford
Buffalo
Binghamton
White Plains
Newburgh
Flint
Lansing
Wilkes-Barre/ Scranton
Islip
Grand Rapids
New York
Newark
Detroit
Kalamazoo
Allentown
Cleveland
Toledo
Harrisburg
Philadelphia
South Bend
Akron/Canton
Atlantic City
Pittsburgh
Fort Wayne
Baltimore
Columbus
Washington D.C.
Clarksburg
Indianapolis
Dayton
Newport News
Huntington
Cincinnati
Charlottesville
Charleston
Richmond
Louisville
Lewisburg/ Greenbrier
Lynchburg
Lexington
Roanoke
Norfolk
Evansville
Raleigh/Durham
Bermuda
Greensboro
Tri-Cities
Asheville
Charlotte
Fayetteville
Nashville
Knoxville
Wilmington
Greenville/ Spartanburg
Florence
Chattanooga
Myrtle Beach
Columbia
Memphis
Huntsville
Atlanta
Augusta
Charleston
Birmingham
Macon
Savannah
Columbus
Montgomery
Albany
Brunswick
Dothan
Valdosta
Jacksonville
Pensacola
Tallahassee
Mobile
Panama City
Gainesville
Daytona Beach
Ft. Walton Beach
Orlando
Melbourne
Tampa
Sarasota
West Palm Beach
Ft. Myers
Ft. Lauderdale
Miami
Key West

Central

Legend

- Destination served by Delta
- Destination served by Delta Connection Carrier
- Destination served by Delta and Delta Connection Carrier
- Destination served by Delta, Delta Connection Carrier and Delta Codeshare Partners

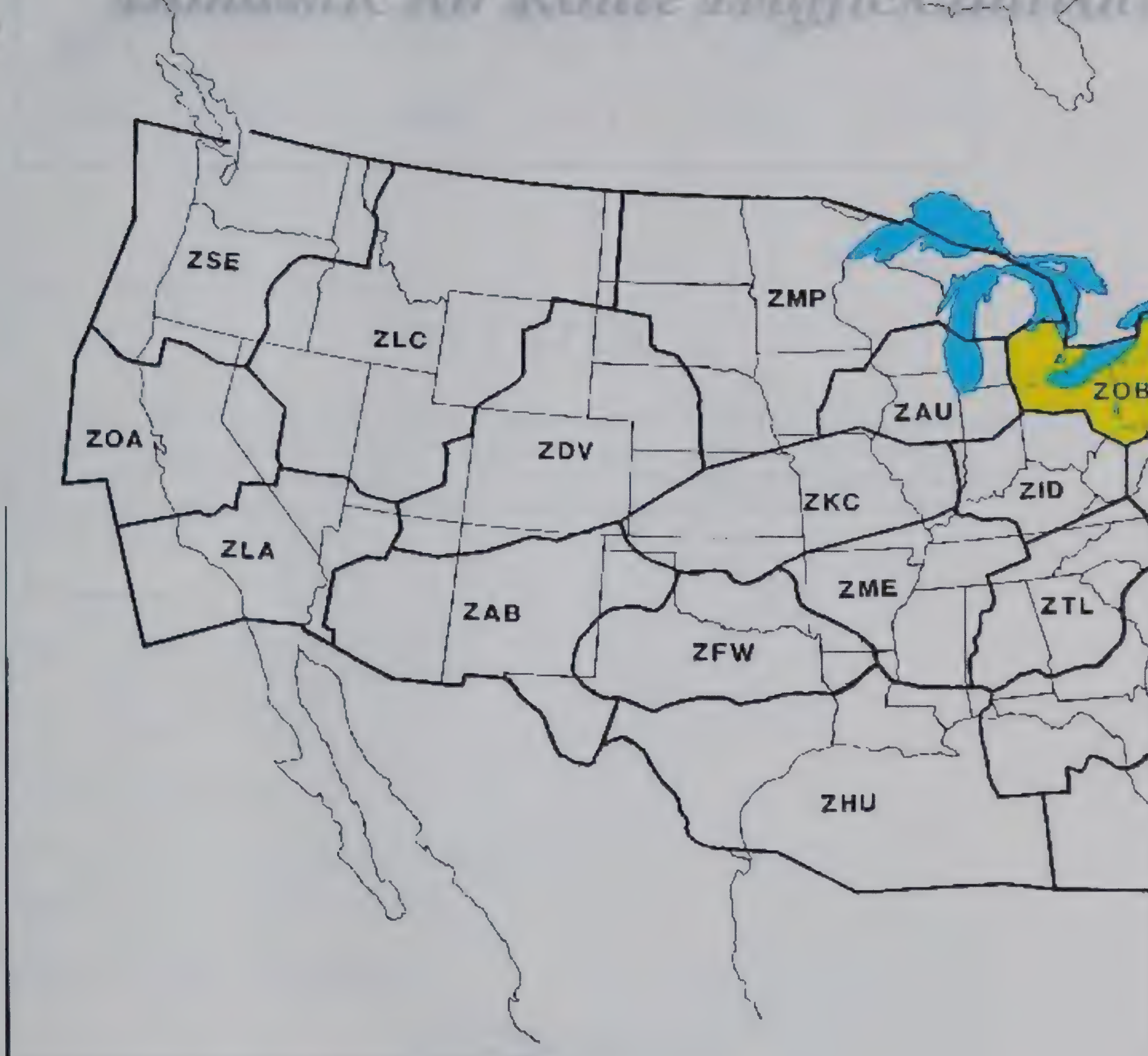
Pacific


Legend
Destination served by Delta
Destination served by Delta Connection Carrier
Destination served by Delta and Delta Connection Carrier
Destination served by Delta, Delta Connection Carrier, and Delta Codeshare Partners
Destination served by Delta and Delta Codeshare Partners
ALASKA
Anchorage
HAWAII
Honolulu
Kahului
Seattle/ Tacoma
Spokane
Portland
Pasco
Elko
Reno
Oakland
Sacramento
San Francisco
San Jose
Fresno
Monterey
Las Vegas
San Luis Obispo
Santa Barbara
Los Angeles
Ontario
Palm Springs
Orange County
San Diego

Mountain


Legend
Destination served by Delta
Destination served by Delta Connection Carrier
Destination served by Delta and Delta Connection Carrier
Destination served by Delta, Delta Connection Carrier, and Delta Codeshare Partners
Kalispell
Great Falls
Missoula
Helena
Butte
Billings
Bozeman
West Yellowstone
Boise
Sun Valley
Cody
Idaho Falls
Jackson Hole
Twin Falls
Pocatello
Casper
Salt Lake City
Denver
Grand Junction
Vail/ Aspen
Colorado Springs
Cedar City
St. George
Albuquerque
Phoenix
Tucson

Domestic Air Route Traffic Control



Airport Information *(Provided by AirNav)*					
MLI	DVN	CWI	MUT	GBG	EZI
C66	C00	3G8	SFY	SQI	I04

Return to the MLI ATCT HomePage

MLI ATCT

The Moline / Quad City Air Traffic Control Tower is located at the Quad City International Airport in Moline Illinois. The airport is the third largest in the state of Illinois in terms of passenger enplanements. The air traffic controllers of the Quad City Tower also provide radar services to Davenport, Clinton, and Muscatine airports in Iowa, and Galesburg, Kewanee, and Savanna airports in Illinois.

To Contact us:

Write: Federal Aviation Administration
Quad City Air Traffic Control Tower
6421 74th Avenue
Milan, IL. 61264

Phone: 1-309-799-5195

Email us at: 9-AGL-MLI-ATCT-SURVEY@faa.gov

Buisness Hours are 7:30 a.m. to 4:00 p.m.

Return to the MLI ATCT Homepage

Scanner Frequencies

Tower 119.4

North Approach 125.95

South Approach 118.2

Calgary**
Vancouver
Seattle
Olympia
Portland
Eugene
Medford
Spokane
Kalispell
Havre
Glasgow
Wolf Point
Sidney
Great Falls
Missoula
Lewistown
Glendive
Helena
Billings**
Miles City
Boise
Idaho Falls
Gillette
Casper
Minneapolis/St. Paul
Milwaukee
Detroit
Chicago (O'Hare)
Des Moines
Omaha
Salt Lake City
Reno
Sacramento
Oakland
San Francisco
San Jose
Denver
Grand Junction
Aspen
Colorado Springs
Montrose
Telluride*
Durango
Farmington
Indianapolis
COLUMB
St. Louis
Kansas City
Wichita
LAS VEGAS
Burbank
Ontario
Los Angeles
Long Beach
Orange County
San Diego
Albuquerque
PHOENIX
Atlant
Dallas/Ft. Worth (DFW)
Tucson
El Paso
Kaua'i
Honolulu
Moloka'i
O'ahu
Maui
Lana'i
Kona
Hilo
The big Island of "Hawai'i"
Hermosillo
Guaymas
New Orleans
Austin
San Antonio
Houston (IAH)
Los Cabos
Mazatlán
Kingman
Flagstaff/Grand Canyon
Lake Havasu City
Prescott
Yuma
PHOENIX
Sierra Vista/Fort Huachuca
Stockton
Fresno
Monterey
Bakersfield
San Luis Obispo
Santa Barbara
Palm Springs
Carlsbad
LAS VEGAS
PHOENIX
America West Express* service to Arizona and California cities

November 24, 2002

The ILLINOIS REPEATER ASSOCIATION is an organization of trustees and representatives of repeaters, state-wide, whose goal is mutual cooperation on the VHF and UHF spectrum, in the voluntary spirit of Amateur Radio.

Frequency Coordinator
Carl Bergstedt, K9VXW
P.O. Box 514
Naperville, IL 60566-0514
k9vxw@sys.com

O	Open/Carrier Access	WX	Weather Net
C	Closed Access	L	Link and/or Crossband
AP	Autopatch	X	Wide Area Coverage
CA	Closed Autopatch	LiTZ	Long Tone Zero
DS	Dual Squelch	P	Portable
E	Emergency Power	Z	Autopatch to Law Enforcement

Location	Region	Output	Input	Callsign	Sponsor	CTCSS	Notes	Upd
Godfrey	STL	29.6200	-	K9KE	K9KE			10/1
Rockford	RFD	29.6200	-	K9AMJ	K9AMJ		E L	01/0
Troy	STL	29.6400	-	AA9MZ	AA9MZ		L	10/2
Godfrey	STL	29.6600	-	K9KE	K9KE			10/1
Tinley Park	NE	29.6600	-	WA9GOB	WA9GOB	114.8		10/1
Chicago	CHI	29.6800	-	KD9FA	ACLR		AP L	07/2
Mascoutah	STL	29.6800	-	AA9ME	AA9ME		L	10/2
Versailles	[illegible]	[illegible]	-	[illegible]	[illegible]	103.5	[Under Const.]	
Itasca	NE	51.7000	51.2000	WA9ZZU	WA9ZZU			01/0
Chicago	CHI	52.8250	52.2250	KD9FA	ACLR		AP L	07/2
DeKalb	NI	52.8500	51.1500	[illegible]	R-FAR	[illegible]	C [Under Const.]	
Paris	EC	52.8500	51.1500	KB9ZU	EDGAR ELEC			01/0
Chicago	CHI	52.8900	51.1900	K9SAD	SADFAR	131.8	AP	11/0
Crystal Lake	NE	52.9100	51.9100	K9VI	BUCKFAR M1	114.8	E	10/1
Schaumburg	NE	52.9500	51.9500	N9KNS	MOTOROLA A	114.8	E	04/0
Rockford	RFD	53.0100	52.0100	K9AMJ	K9AMJ		E L	01/0
Des Plaines	NE	53.0500	51.3500	WB9QZB	+WB9QZB			11/0
Crystal Lake	NE	53.1700	51.4700	W9CEE	CEEARS	107.2		04/2
Decatur	DEC	53.2300	51.5300	WA9RTI	MACONCOARC	103.5	E	12/2
Deerfield	NE	53.2500	51.5500	N9GUN	CHINET			11/1
Chicago	CHI	53.3300	51.6300	W9GG	STANFAR	100.0		01/0
Godfrey	STL	53.3500	51.6500	K9KE	K9KE			10/1
Peoria	PIA	53.8700	52.1700	N9HUW	PALS			10/2
Batavia	NI	53.9100	52.2100	N9ODP	N9ODP	114.8	AP E L Z [Under Const.]	
Washington	PIA	53.9900	52.2900	W9UVI	PAARC	103.5	CA L Z	12/2
Belleville	STL	145.1100	-	N9NJX	N9NJX		CA E L Z	10/2
Chicago	CHI	145.1100	-	W9GN	UFDA	107.2		12/1
Godfrey	STL	145.1300	-	K9KE	K9KE		AP E L Z	10/1
Grayville	SE	145.1300	-	N9ASN	SLNCORA			12/1
Kankakee	NE	145.1300	-	KB9LXA	FARG	107.2	CA	11/1
Peoria	PIA	145.1500	-	WA9HBX	Rewds AR		[Proposed]	
Schaumburg	NE	145.1500	-	N9IRG	BEAR	107.2	AP E Z	10/1
Little York	W	145.1700	-	KA9EEM	N0VHK	100.0		10/1
Naperville	NE	145.1700	-	WA9DNZ	MORAD	103.5	AP	11/0
Argonne	NE	145.1900	-	W9ANL	ARGONNARC			01/2
Marion	SE	145.1900	-	AA9ET	AA9ET	88.5		12/1
Chicago	CHI	145.2100	-	W9CEE	CEEARS	107.2	CA E L	04/2
Chicago	CHI	145.2100	-	W9CEE	CEEARS	107.2		04/2
Morrison	NW	145.2100	-	KA9QYS	S/RF ARS	114.8	CA E	11/0
Godfrey	STL	145.2300	-	K9HAM	LCRC		AP E L Z	01/0
Schaumburg	NE	145.2300	-	K9IIK	SARC	107.2	CA	11/1
Downers Grove	NE	145.2500	-	W9DUP	DARC	107.2	CA E	12/2
Marion	S	145.2500	-	KB9YKG		88.5	E	01/0
New Douglas	STL	145.2500	-	KC9CIM		[illegible]	E [Proposed]	
East Peoria	PIA	145.2700	-	KA9GCI	PEKIN RPTG	103.5	AP E Z	01/1
Paris	EC	145.2700	-	KB9ZU	EDGAR ELEC	82.5		01/2
Antioch	NE	145.2900	-	KA9VZD	STLIN ARC		AP E L Z	12/1
Gillespie	STL	145.2900	-	K9KE	K9KE			10/1
Utica	NC	145.2900	-	[illegible]	TCARS	103.5	E WX [Proposed]	10/1
Elsah	STL	145.3100	-	WA9NYN	WA9NYN		CA E	10/1
Hoffman Estates	NE	145.3100	-	W9CCU	WCRA			11/0
Ogden	CHA	145.3100	-	NO9Z	NO9Z			10/1
Crystal Lake	NE	145.3300	-	N9HEP	N9HEP	107.2	CA E	10/1
Mattoon	EC	145.3300	-	KF9NB	KF9NB	186.2		10/1
Morrison	NE	145.3500	-	W9CEE	CEEARS	107.2	E	04/2
Wasco	NE	145.3500	-	W9CEE	CEEARS	107.2		04/2
Charleston	EC	145.3700	-	KF9NB	CENILLRS		E	10/1
Dunlap	PIA	145.3700	-	N9BBO	N9BBO	156.7	CA E L	10/1
Schaumburg	NE	145.3700	-	K9SO	AMA			11/1
Lincoln	C	145.3900	-	N9EZJ	+KG9IW	103.5	Z	01/0
Mascoutah	STL	145.3900	-	AA9ME	AA9ME		L	10/2
McHenry	NE	145.4100	-	KB9I	ARROW		CA E Z	11/0
Gridley	BLM	145.4300	-	KD9F	FLANAGAN A	103.5		01/2
Hickory Hills	NE	145.4300	-	W9VGE	HHARC	110.9	CA E L RACES	11/1
Taylorville	SPF	145.4300	-	N9FU	N9FU	79.7		03/2

Versailles	WC	145.4300	-	KB9JVU	KB9JVU	103.5		12/2
Granite City	STL	145.4500	-	WA9REW	SPRAVRPT			10/1
Pekin	PIA	145.4500	-	KA9GCI	PEKIN RPTG	103.5	AP Z	01/1
Batavia	NE	145.4700	-	KB9RYA	KCARS	103.5	E	10/1
Godfrey	STL	145.4700	-	N9GGF	N9OWS+	123.0		11/0
Galva	W	145.4900	-	AA9RO	AARO	88.5	DS	10/2
Newton	SE	145.4900	-	K9ZN	JARS		O E	11/1
Westmont	NE	145.4900	-	WB9UGX	WSTMTESDA	107.2	AP E L RACES	11/1
Batavia	NE	146.5800	147.6600	W9ZGP	NIARC		E	01/0
Rockford	RFD	146.6100	-	W9AXD	RARA	114.8	AP E	01/0
Topeka	PIA	146.6100	-	N9OSR	N9OSR	103.5	AP E	01/1
Lerna	EC	146.6250	-	W9CUE	UMRA	103.5		01/2
Mattoon	EC	[illegible]	-	KA9LRZ	UMRA	107.2	[Proposed]	
Rock Falls	NC	146.6250	-	N9ORQ	N9ORQ	100.0	AP E	11/1
Blue Island	NE	146.6400	-	W9SRC	STARS	107.2	CA E	04/0
Gillespie	STL	146.6400	-	WA9FDP	MONTEMAC A			11/0
Marion	S	146.6400	-	W9RNM	SARA	88.5	CA E	03/2
Moline	NW	146.6400	-	W0BXR	DAVRC			10/1
Cadwell	DEC	146.6550	-	W9BIL	MARK		E	01/2
Crystal Lake	NE	146.6550	-	KB9WGV	KB9WGV	107.2		11/0
Monmouth	WC	146.6550	-	W9XYZ	W9XYZ	173.8	E	10/2
Chicago	CHI	146.6700	-	WB9AET	WAFAR	107.2	CA L Z	01/0
Pekin	PIA	146.6700	-	W9TAZ	TCARS	103.5		12/1
Springfield	SPF	146.6850	-	WA9KRL	WA9KRL			12/2
Union	NE	146.6850	-	N9KHI	N9KHI	107.2		10/1
Flora	SE	146.7000	-	KC9AGC	CCARC		CA	01/0
Schaumburg	NE	146.7000	-	WB9PHK	STROKE	100.0	CA L	01/2
Beardstown	WC	146.7150	-	KB9KCQ	IVARC	103.5		11/0
Plainfield	NE	146.7150	-	KA9OOP	ARP	107.2	CA	11/2
Carbondale	S	146.7300	-	W9UIH	SIUARC		CA	11/0
Chicago	CHI	146.7300	-	WB9RFQ	+WB9RFQ	107.2	CA E	01/2
Decatur	DEC	146.7300	-	K9HGX	CENOIS ARC	123.0	Z	10/1
Malta	NE	146.7300	-	WA9CJN	KARC	100.0	E	11/0
Fredrick	WC	146.7450	-	AA9GK	AA9GK		CA	12/2
Champaign	CHA	146.7600	-	W9SEH	TCARC			12/2
Chicago	CHI	146.7600	-	WA9ORC	CFMC	107.2	CA	01/2
East Moline	NW	146.7600	-	K9JL	K9JL	100.0	L	12/1
Olney	SE	146.7600	-	K9QAT	WA8AFM		CA E	01/0
Peoria	PIA	146.7600	-	W9UFF	HIFC		E	05/0
Jacksonville	SPF	146.7750	-	K9JX	JARS		AP E Z	04/1
Roscoe	NC	146.7750	-	KA9WON	BEARS		CA	10/1
Bloomington	BLM	146.7900	-	K9CYW	McLEANCOAR		L	12/1
Collinsville	STL	146.7900	-	W9AIU	EGYPTN RC		CA L	01/0
Edwardsville	STL	146.7900	-	W9AIU	EGYPTN RC	127.3		01/0
Elgin	NE	146.7900	-	WR9ABQ	VARA	107.2	CA E	10/1

Hazelcrest	NE	146.8050	-	WD9HSY	TRITOWN AR	107.2	E	10/2
Pawnee	SPF	146.8050	-	N9MAF	N9MAF	94.8		10/1
Rockford	RFD	146.8050	-	K9AMJ	K9AMJ		CA E L	01/0
West Frankfort	S	146.8050	-	KB9ADK	LEARS	88.5		12/1
Danville	EC	146.8200	-	W9MJL	VCARA		CA ARES Z	01/0
Gillespie	STL	146.8200	-	WA9FDP	MONTEMAC A		AP E Z	11/0
Joliet	NE	146.8200	-	W9OFR	WCARL		E	11/1
Taylorville	SPF	146.8350	-	N9OGL	N9OGL			11/0
Woodstock	NE	146.8350	-	K9ESV	MCESDA	107.2	E WX RACES	12/0
Alto Pass	S	146.8500	-	K9GOX	MTAVARG		O E	10/1
Chicago	CHI	146.8500	-	WA9DZO	M.A.P.S.		E L	11/2
Loda	E	146.8500	-	W9NKX	IFARS	179.9		10/2
Peoria	PIA	146.8500	-	W9UVI	PAARC		AP E Z	12/1
Sterling	NC	146.8500	-	W9MEP	S/RF ARS	114.8	CA	10/2
Carlinville	STL	146.8650	-	W9FJ	MCRC			10/2
Chicago	CHI	146.8800	-	K9GFY	SARA	107.2	CA Z	10/2
Herod	SE	146.8800	-	K9TSI	SCAN	88.5	E L	10/2
Effingham	SC	146.8950	-	K9UXZ	NTARC		E	01/2
Streator	NC	146.8950	-	N9HT	N9HT			10/2
Tremont	PIA	146.9100	-	WA9DKO	TCESDA		E	10/2
Gilberts	NE	146.9250	-	WA9VGI	RATFAR	100.0		04/2
Monticello	EC	146.9250	-	K9IYP	PICO RAMS		E WX	03/1
Bloomington	BLM	146.9400	-	W9AML	CIRC		E	02/0
Kankakee	NE	146.9400	-	W9AZ	KARS		AP	11/0
Moline	NW	146.9400	-	W0BXR	DAVRC			10/1
Mt. Carmel	SE	146.9400	-	AI9H	W9GH		AP E Z	10/2
Quincy	WC	146.9400	-	W9AWE	WIARC		E	12/2
Bridgeview	NE	146.9550	-	WB9ZPE	WB9ZPE	114.8	AP	01/2
Marion	S	146.9550	-	AA9QK		107.2		10/2
Princeton	NC	146.9550	-	WB9NTG	RED COVERE	103.5		10/2
Taylorville	SPF	146.9550	-	N9FU	CCARC	79.7	E	11/1
Dixon	NC	146.9700	-	N9JWI	LEE CO. ES	82.5	E	10/1
Hinsdale	NE	146.9700	-	[illegible]	[illegible]	107.2	[Under Const.]	01/0
Kickapoo	PIA	[illegible]		[illegible]	[illegible]	103.5	AP E [Under Const.]	
Arlington Heights	NE	146.9850	-	WB9TAL	ARCOMLEAGU	107.2	AP	12/1
Clinton	C	146.9850	-	KA9YPK	KA9YPK			10/2
Tamaroa	SC	146.9850	-	N9LUD	T.A.R.A.	107.2	E	10/2
Galesburg	WC	147.0000	-	W9GFD	KNOXCARC		AP E L Z	11/0
Rockford	RFD	147.0000	+	W9AXD	RARA	114.8		01/0
Elk Grove Village	NE	147.0150	+	KB9L	EGDXA	107.2	E	12/2
Normal	BLM	147.0150	+	NX9M	McLEANCOAR	88.5	CA E	11/1
Casey	EC	147.0300	+	W9GWF	EIHC-W9GWF		O E	12/1
Lake Villa	NE	147.0300	+	WB9RKD	WB9RKD	107.2	AP E L Z	11/0

Quincy	WC	147.0300	+	W9AWE	WIARC	103.5	CA E Z	12/2
Watseka	EC	147.0300	+	W9RWX	IROQUOIS C			10/2
Athens	SPF	147.0450	+	N9YAY	N9YAY	210.7	E WX L	11/0
Oregon	NW	147.0450	+	KB9DBG	KB9DBG		CA E	10/1
Hines	NE	147.0600	0.0000	WB9AGH	NE IL COMM		E	04/2
Macomb	WC	147.0600	+	W9SSP	LEARC	103.5	AP E Z	01/2
Urbana	EC	147.0600	+	K9CW	CCESDA		E	11/0
Washington	PIA	147.0750	+	W9UVI	PAARC	103.5	CA E Z	12/1
Campbell Hill	SW	147.0900	+	KE9WR	TCARC			01/0
Glenview	NE	147.0900	+	W9AP	NORA	107.2	CA E Z	01/0
Virden	SW	147.0900	223.5400	WD9EBQ	MCESDASWDS			10/1
Decatur	DEC	147.1000	+	WA9RTI	MACONCOARC			12/2
Mt. Morris	RFD	147.1050	+	K9AMJ	K9AMJ			01/0
Belleville	STL	147.1200	+	K9GXU	STCARC		CA Z	11/1
Hampshire	NE	147.1200	+	K8IE	HAMPSHIRE		L	01/0
Leonore	NC	147.1200	+	W9MKS	SRRC	103.5	CA Z	
Markham	NE	147.1350	+	W9NXP	AREA			01/0
Mt. Vernon	SE	147.1350	+	KB9KDE	ARCOM		CA E	02/1
Quincy	WC	147.1350	+	WB9OTW	WB9OTW			02/0
Savanna	NW	147.1350	+	N9FID	P.A.R.C.		E	01/2
Bloomington	BLM	147.1500	+	WD9FTV	GENTEL ARC		AP	10/1
Chicago	CHI	147.1500	+	W9SRO	CFAR	107.2		01/2
Greenville	C	147.1650	+	W9KXQ	OVARC		E L	10/1
Kankakee	NE	147.1650	+	KB9JZJ	KB9JZJ	107.3	AP	12/0
Marengo	NE	147.1650	+	K9AMJ		114.8	E L	01/0
Libertyville	NE	147.1800	+	W9FUL	LAKE CO RA	127.3		12/1
Mt. Vernon	SC	147.1800	+	W9EAR	EARS	107.2	L	12/1
Sparland	PIA	147.1800	+	WB9NNS	WB9NNS			01/2
Tovey	SPF	147.1800	+	WE9W	WE9W	136.5		10/1
Carbondale	S	147.1950	+	KA9YGR	KA9YGR		E	11/0
Quincy	WC	147.1950	+	WB9ROZ	QARG		Z	11/0
Rockford	RFD	147.1950	+	K9RFD	RTG		E	10/1
Urbana	CHA	147.1950	+	N9HQB	NO9Z		CA	10/1
Aurora	NE	147.2100	+	W9CEQ	FRRL, INC.	103.5	E	11/0
Galesburg	WC	147.2100	+	W9SLO	KNOX CO CD			11/0
Godfrey	STL	147.2100	+	K9KE	K9KE		AP E L	10/1
Allerton	CHA	147.2250	+	K9LOF	K9LOF	146.2		10/1
Chicago	CHI	147.2250	+	KD9FA	ACLR	107.2	AP L	07/2
Metropolis	S	147.2250	+	N9IBS	MAMA ARC	123.0	AP E Z	11/1
Gurnee	NE	147.2400	+	W9MAB	GURNEE RG	127.3	CA E	10/1
Metamora	PIA	147.2550	+	K9UQF	WCRA			11/0
Rockford	NE	147.2550	+	N9MCS	N9MCS	94.8		10/1
Thebes	S	147.2550	+	K9IM	904 ARC	118.8	E	12/1
Byron	RFD	147.2700	+	KA9NYN	BARC	114.8	E	12/2
Morris	NE	147.2700	+	KB9SZK	GCARC	107.2	CA E Z	01/2

Pittsfield	WC	147.2700	+	N9DO	N9DO			10/1
Salem	SC	147.2700	+	W9CWA	CWA		E	11/0
Allerton	CHA	147.2850	+	K9LOF	K9LOF	146.2		10/1
Canton	PIA	147.2850	+	K9ILS	FCARC	103.5	CA E Z	01/1
Schaumburg	NE	147.2850	+	N9CXQ	NAPS	107.2	CA E L Z	02/2
Freeport	NW	147.3000		KB9QDA		88.5	[Proposed]	
Herald	SE	147.3000	+	K9RZP	INRAC	88.5	E	10/1
Joliet	NE	147.3000	+	WD9AZK	MAVERICK A		CA Z	11/1
Niles	NE	147.3150	+	W9FO	METRO ARC			12/2
Springfield	SPF	147.3150	+	W9HJA	W9HJA		O	11/1
Bolingbrook	NE	147.3300	+	WD9AKO	BARS		CA E	01/1
Lincoln	C	147.3450	+	K9ZM	LOGAN ESDA			10/1
Oregon	NC	147.3450	+	N9ECQ	N9ECQ			02/1
Tunnel Hill	SC	147.3450	+	W9WG	TRGHILARA		E	11/1
Winnetka	NE	147.3450	+	NS9RC	NSRC	107.2	CA E	11/0
Robinson	SE	147.3600	+	WA9ISV	CCARC/IEMA		AP E Z	01/0
Wheaton	NE	147.3600	+	W9BZW	NORTHERN I	136.5		11/0
Belvidere	RFD	147.3750	+	K9ORU	BRC	100.0	E	11/0
Springfield	SPF	147.3750	+	WA9KRL	WA9KRL	110.9		12/2
Yorkville	NE	147.3750	+	N9FNS	N9FNS	103.5		10/2
Freeport	NC	147.3900	+	KB9RNT	SCRA		CA E	11/0
Weston	C	147.3900		WB9DUC	SCRA	127.3	[Proposed]	11/0
Joliet	NE	223.8200	-	W9OFR	WCARL		AP E L	11/1
Canton	PIA	223.8600	-	N9GA	N9GA			01/0
Westmont	NE	223.8600	-	N9TO	N9TO			10/2
Chicago	CHI	223.8800		KB9SFB	KB9SFB	110.9	[Under Const.]	10/1
Rockford	RFD	223.8800	-	W9AXD	RARA			01/0
Mt. Prospect	NE	223.9000	-	WB9UOM	ORD 220			10/1
Hampshire	NE	223.9200	-	W9ZS	W9ZS		CA Z	10/1
Schaumburg	NE	223.9400	-	N9EP	WRC	110.9	L	10/1
Park Forest	NE	223.9600	-	WB9UAR		110.9	CA	01/0
Chicago	CHI	224.0200	-	W9TMC	TMCARC			04/2
Rockford	RFD	224.0400	-	K9AMJ	K9AMJ		CA E L	01/0
Chicago	CHI	224.0600	-	WD9GEH	WD9GEH	110.9		10/1
Collinsville	STL	224.0600	-	W9AIU	EGYPTN RC		CA L	01/0
Edwardsville	STL	224.0600	-	W9AIU	EGYPTN RC		O CA	01/0
Dunlap	PIA	224.0800	-	N9BBO	N9BBO	156.7	CA E L	10/1
Gurnee	NE	224.0800	-	W9MAB	GURNEE RG		CA E	10/1
Chicago	CHI	224.1000	-	WA9ORC	CFMC		CA	01/2
East Moline	NW	224.1000	-	NN9K	NN9K			11/0
Belleville	STL	224.1200	-	K9GXU	STCARC		AP Z	11/1
Greenville	C	224.1400	-	W9KXQ	W9KXQ			10/1
Brookfield	NE	224.1600	-	K9SAD	SADFAR	110.9	AP E L Z	11/0
Hazel Crest	NE	224.1800	-	WA9ORC	CFMC			01/2
Mascoutah	STL	224.2000	-	AA9ME	AA9ME		L	10/2

Naperville	NE	224.2000	-	W9NPD	NPDARC	110.9		01/0
Bloomingdale	NE	224.2200	-	K9NB	BARK	110.9		10/1
Deerfield	NE	224.2400	-	KA9REN	CHINET		CA	10/2
Northbrook	NE	224.2600	-	WB9KNX	WB9KNX	110.9	E	10/2
Danville	EC	224.2800	-	KA9SKS	KA9SKS			11/2
Rockford	RFD	224.2800	-	N9CCE	N9CCE		AP E	11/0
Godfrey	STL	224.3000	-	N9GGF	N9OWS+		E L	11/0
Hickory Hills	NE	224.3000	-	W9VGE	HHARC	110.9	CA E L	11/1
Deerfield	NE	224.3200	-	NS9RC	NSRC	110.9	CA	11/0
Chicago	CHI	224.3400	-	W9RA	DONFAR	103.5		04/2
Lisle	NE	224.3600	-	W9US	FUBAR	110.9	AP E L Z	01/2
Rolling Meadows	NE	224.3800	-	WB9WNK	MATS	110.9	AP L	11/0
Batavia	NE	224.4000	-	W9XA	W9XA		E L	10/1
Godfrey	STL	224.4000	-	K9KE	K9KE		E L	10/1
New Lenox	NE	224.4200	-	N2BJ	N2BJ		AP E L	11/0
Greenville	C	224.4400	-	W9KXQ	OVARC		E L	10/1
Rockford	RFD	224.4400	-	K9AMJ	K9AMJ		CA E L	01/0
Bloomington	BLM	224.4600	-	K9MBS	K9MBS			11/0
Chicago	CHI	224.4800	-	KD9FA	ACLR		L	07/2
Itasca	NE	224.5000	-	WA9ZZU	WA9ZZU			01/0
Bolingbrook	NE	224.5400	-	K9BAR	BARS		CA E Z	10/1
Schaumburg	NE	224.5600	-	K9EL	EGDXA	110.9	L	11/0
Buffalo Grove	NE	224.5800	-	WB9TAL	ARCOMLEAGU	110.9	CA L	12/1
Dixon	NC	224.6000	-	WD9CJB	WD9CJB		E	11/1
Glenview	NE	224.6000	-	W9AP	NORA	110.9		01/0
Lisle	NE	224.6200	-	WA9AEK	WA9AEK	110.9		10/2
Batavia	NE	224.6400	-	N9ODP	N9ODP		O AP E WX RACES	01/2
Schaumburg	NE	224.6600	-	WB9YBM	WB9YBM		C	10/1
Clarendon Hills	NE	224.6800	-	W9DUP	DARC			12/2
Crystal Lake	NE	224.7000	-	K9VI	K9QI	100.0	E L	10/1
Chicago	CHI	224.7200	-	KA9QPZ	WSNSTVARC	114.8	CA E	10/1
Schaumburg	NE	224.7600	-	N9CXQ	NAPS	110.9	CA E L Z	02/2
Park Ridge	NE	224.7800	-	KB9II	FAROUT			10/1
Wheaton	NE	224.8200	-	KF9OA	DART	110.9		06/2
Marengo	NE	224.8400	-	K9AMJ	K9AMJ		O E L	01/0
Chicago	CHI	224.8600	-	W9SRO	CFAR	110.9		01/2
Lanark	NW	224.8600	-	WB9NLQ	SRG			10/1
Oak Brook	NE	224.8800	-	KB2MAU	RAYFAR		AP E	01/1
Schaumburg	NE	224.8800	-	KB2MAU	RAYJACK	110.9		01/1
Downers Grove	NE	224.9200	-	NK9M	NK9M/DARN			10/1
Freeport	NC	224.9200	-	W9FN	W9FN	100.0	CA E	05/2
Versailles	W	[illegible]		KB9JVI		[illegible]	[illegible]	
Orland Park	NE	224.9400	-	N2BJ	ANDREWS RA		AP E L	11/0
Schiller Park	NE	224.9800	-	WB9AET	WAFAR	110.9	CA	01/0

New Douglas	[illegible]	442.0000		N0SCT		[illegible]	E [Proposed]	
Lockport	NE	442.0250	+	NC9T	P.A.D.X.A.	100.0		01/0
Pittsfield	WC	442.0250	+	N9ACT	N9ACT	88.5		10/1
Bloomingdale	NE	442.0500	+	N9JYA	N9JYA			07/2
Tovey	SPF	442.0500	+	WE9W	WE9W	79.7	AP	10/1
Chicago	CHI	442.0750	+	NS9RC	NSRC	100.0		11/0
Rockford	RFD	442.0750	+	N9CCE	N9CCE		AP	11/0
Troy	STL	442.0750	+	AA9MZ	AA9MZ		AP L	10/2
Libertyville	NE	442.1000	+	W9UHF	RATFAR	114.8		04/2
Chicago	CHI	442.1250	+	WD9GEH	WD9GEH	203.5		10/1
Elgin	NE	442.1250	+	KB9PWP	KB9PWP	118.8		11/0
Peoria	PIA	442.1250	+	W9GAO	HIFC		E	05/0
Barrington Hills	NE	442.1500	+	WD9IAE	WD9IAE			01/0
Nokomis	C	442.1500	+	N9TZ	N9TO	88.5	TT	
Collinsville	STL	442.1750	+	KD6TVP	KD6QKX	103.5	CA	12/1
Galva	W	442.1750	+	AA9RO	AARO	103.5	DS	10/2
Salem	SC	442.2000	+	W9CWA	CWA	103.5	CA E	11/0
Godfrey	STL	442.2250	+	K9HAM	LCRC			01/0
Naperville	NE	442.2250	+	WA9WSL	LUCENT IHA	114.8	L	05/0
Decatur	DEC	442.2500	+	WA9RTI	MACONCOARC	103.5	E	12/2
Schaumburg	NE	442.2750	+	K9IIK	SARC	114.8		11/1
Joliet	NE	442.3000	+	W9OFR	WCARL		E	11/1
Toledo	SC	442.3000	+	W9MBD	HWKNOEBEL	103.5		01/0
North Chicago	NE	442.3250	+	N9FJS	LBRG		CA E	10/1
Topeka	PIA	442.3250	+	N9OSR	N9OSR		AP E L Z	01/0
Winnebago	NC	442.3500	+	W9TMW	W9TMW	88.5	CA E	10/1
Chicago	CHI	442.3750	+	WB9PIZ	WB9PIZ	114.8		01/0
Marengo	NE	442.3750	+	KA9LOY	N9AWQ	210.7	CA L	11/1
Tuscola	EC	442.3750	+	KB9QWI	KB9QWI	114.8		11/1
Chicago	CHI	442.4000	+	K9NBC	PARC	114.8	E	11/0
Edwardsville	STL	442.4000	+	W9AIU	EGYPTN RC	127.3	CA E Z	01/0
Grays Lake	NE	442.4250	+	N9MRT	K9SA	114.8	L	11/0
Loda	E	442.4250	+	K9UXC	K9UXC		CA	10/2
Chicago	CHI	442.4500	+	K9QKB	MRCA			02/2
Ramsey	C	442.4500	+	WB9NEY	WB9NEY			11/0
Sugar Grove	NE	442.4750	+	KA9HPL	KA9HPL		AP	02/1
Crete\Steger	NE	442.5000	+	KE9FC	WOODFAR	114.8	AP L	01/0
Oregon	NC	442.5000	+	N9ECQ	Ogle Cty	94.7	CA E Z	02/1
Delavan	PIA	442.5250	+	KB9RAO	KB9RAO	151.4		11/1
Libertyville	NE	442.5250	+	W9CEE	CEEARS	114.8	E	04/2
Downers Grove	NE	442.5500	+	W9DUP	DARC	114.8	CA	12/2
Granite City	STL	442.5500	+	KZ9D	KZ9D			11/0
Chicago	CHI	442.5750	+	K9CDW	SATURN			11/0
Pawnee	SPF	442.6000	+	N9MAF	N9MAF	94.8		10/1
Cherry Valley	NE	442.6250	+	W9FT	PIGFAR	100.0		11/0

Melrose Park	NE	442.6250	+	W9FT	PIGFAR	114.8		11/0
Malta	NC	442.6500	+	WA9Z	WA9Z	244.0	CA E	11/0
Marengo	NE	442.6750	+	K9AMJ	K9AMJ	100.0	E L	01/0
Orland Park	NE	442.6750	+	W9SRC	STARS	131.8		04/0
Tallula	SPF	442.6750	+	K9KGO	K9KGO	151.4	E	10/1
Chicago	CHI	442.7000	+	K9VXW	AARC	114.8		10/1
Normal	BLM	442.7000	+	WB9UUS	WB9UUS		AP E L	11/2
Monticello	EC	442.7250	+	KB9ZAM	UBIQUITOUS	103.5		06/2
Winnetka	NE	442.7250	+	NS9RC	NSRC	114.8		11/0
Schaumburg	NE	442.7750	+	W9TK	W9TK	110.9	CA E	02/2
Wood River	STL	442.7750	+	WB9HZG	WB9HZG	114.8	CA	11/1
Decatur	DEC	442.8000	+	K9IV	K9IV	77.0	CA	04/2
Schaumburg	NE	442.8000	+	N9EP	WRC	114.8	L	10/1
Belvidere	RFD	442.8250	+	N9KUX	N9KUX	114.8	E	11/0
Plainfield	NE	442.8500	+	KA9OOP	ARP			11/2
Downers Grove	NE	442.8750	+	W9PCS	York RC	114.8		11/1
Alton	STL	442.9000	+	K9HAM	LCRC			01/0
Schaumburg	NE	442.9000	+	WA9VGI	FISHFAR	114.8	AP	02/2
Greenville	SW	442.9250	+	KB9EGI	OVARC		E Z	10/1
Malta	NC	442.9250	+	WA9VGI	FISHFAR	114.8	E	02/2
Lombard	NE	442.9500	+	WB9HYB	WB9HYB	114.8		10/2
Malta	NC	442.9500	+	WA9VGI	FISHFAR	131.8	CA	08/0
Chicago	CHI	442.9750	+	WA9VGI	FISHFAR	114.8	AP	02/2
Table Grove	WC	442.9750	+	N9EM	N9EM	110.9	CA	01/1
Chicago	CHI	443.0000	+	W9LM	NARC	114.8		01/1
East Peoria	PIA	443.0000	+	KA9GCI	PEKIN RPTG	103.5	AP E Z	01/1
Godfrey	STL	443.0000	+	K9KE	K9KE	103.5	AP E L Z	10/1
Dundee	NE	443.0250	+	W9DWP	W9DWP/KCOE			12/1
Naperville	NE	443.0500	+	WB9QAH	NEMA	114.8	CA	12/2
Cary	NE	443.0750	+	WB9PHK	STROKE	114.8	CA L	01/2
O'Fallon	STL	443.1000	+	K9AIR	SPARC			01/1
Schaumburg	NE	443.1000	+	WB9PHK	STROKE	114.8	CA L	01/2
Dunlap	PIA	443.1250	+	N9BBO	N9BBO	156.7		10/1
Westmont	NE	443.1250	+	KG9F	KG9F	114.8	C	11/0
Schaumburg	NE	443.1500	+	N9OZB	ARG	114.8		10/2
Crystal Lake	NE	443.2000	+	N9EAO	FROGFAR #2	131.8	L	
Downers Grove	NE	443.2000		N9EAO	FROGFAR #?	131.8	[Under Const.]	
Orland Park	NE	443.2250	+	KB9KV	ANDREWS RA		AP E L	11/0
Lake Zurich	NE	443.2500	+	K9SA	SUHFARS	114.8	CA	11/0
Carlinville	STL	443.2750	+	N9OWS	N9OWS			11/0
Freeport	NC	443.2750	+	KB9RNT	KB9RNT	114.8		11/0
Godfrey	STL	443.2750	+	N9GGF	N9GGF			11/0
Oak Forest	NE	443.2750	+	N9ZD	WB9ZKD	114.8	E	12/1
Galva	W	443.3000	+	WA9BA	AARO	103.5		10/2
La Grange Park	NE	443.3000		K9ONA	SMCC	114.8	[Under Const.]	01/0

Congerville	BLM	443.3250	+	KE9HB	KE9HB	107.2		01/0
Frankfort	NE	443.3250	+	WD9HSY	WD9HSY	114.8		10/2
Godfrey	STL	443.3500	+	K9KE	K9KE			10/1
Lake Zurich	NE	443.3500	+	K9SA	K9SA	114.8	CA E L	11/0
Chicago	CHI	443.3750	+	K9QKW	WB9RFQ			10/1
Eagleton	S	443.4000	+	W9IMP	OTHG			08/2
Godfrey	STL	443.4000	+	N9GGF	N9OWS	123.0		11/0
Lockport	NE	443.4000	+	KB2MAU	RAYFAR	114.8		01/1
Dixon	NC	443.4250	+	KA9PMM	KA9PMM	136.5		01/0
Gurnee	NE	443.4250	+	KF9PI	GUFAR	131.8		03/0
Rockford	NC	443.4500	+	WB9TFX	WB9TFX	114.8		11/2
Crystal Lake	NE	443.4750	+	N9HEP	N9HEP	114.8	E	10/1
Paris	EC	443.4750	+	KB9ZU	EDGAR ELEC	82.5		01/2
Dekalb	NE	443.5000	+	WA9Z	WA9Z	118.8		11/0
Godfrey	STL	443.5000	+	K9KE	K9KE	103.5	AP E L	10/1
Gurnee	NE	443.5000	+	W9MAB	GURNEE RG	127.3	CA E	10/1
Bolingbrook	NE	443.5250	+	K9BAR	BARS		CA Z	10/1
Sheridan	NE	443.5500	+	N9LCH	N9LCH	114.8		10/1
Bement	DEC	443.5750	+	KB9WEW	PCESDA	103.5	CA E TT	12/2
Schaumburg	NE	443.5750	+	N9KNS	MOTO ARC	114.8		04/0
Chicago	CHI	443.6000	+	WB9AET	WAFAR	114.8	CA	01/0
Godfrey	STL	443.6000	+	K9KE	K9KE	103.5	AP E L	10/1
Schaumburg	NE	443.6250	+	N9CXQ	NAPS	114.8	CA E L Z	02/2
Batavia	NE	443.6500	+	W9XA	W9XA	114.8	CA L	10/1
Batavia	NE	443.6500	+	WB9PHK	STROKE	114.8	CA L	01/2
Chicago	CHI	443.6750	+	W9WBY	DEVRY ARS	114.8		10/2
Chicago	CHI	443.7000	+	KD9FA	ACLR	114.8	AP L	07/2
Godfrey	STL	443.7000	+	K9KE	K9KE	100.0	AP E L	10/1
Mattoon	SC	443.7250	+	N9VLD	N9VLD	103.5		10/2
Schaumburg	NE	443.7250	+	N9KNS	MOTOROLA A	114.8		04/0
Carlinville	STL	443.7500	+	N9OWS	N9OWS	107.2	CA	11/0
Chicago	CHI	443.7500	+	WA9ORC	CFMC	114.8	CA	01/2
Coal City	NE	443.7750	+	N9IWJ	BARN	114.8		11/1
Round Lake Beach	NE	443.7750		N9JSF	N9JSF	127.3	[Under Const.]	12/0
Chicago	CHI	443.8000	+	K9SAD	SADFAR	103.5	AP	11/0
Decatur	DEC	443.8000	+	K9HGX	CENOIS ARC	123.0		10/1
Lake Zurich	NE	443.8500	+	KD9GY	LC RACES	114.8	E	02/2
Chicago	CHI	443.8750	+	KA9QPZ	WSNSTVARC	114.8	AP E	10/1
Downers Grove	NE	443.9000	+	N9ATO	SERCOMM	114.8		04/0
Mascoutah	STL	443.9000	+	AA9ME	AA9ME		L	10/2
Quincy	WC	443.9000	+	W9AWE	WIARC		CA E Z	12/2
Versailles	WC	443.9250	+	KB9JVU	KB9JVU	88.5		12/2
Beardstown	WC	443.9500	+	KB9KCQ	IVARC			11/0
Calumet City	NE	443.9500	+	KA9OOI	CHUMPS	131.8		10/1

Elgin	NE	444.9500	+	WR9ABQ	VARA	114.8		10/1
Metropolis	S	444.9750	+	N9IBS	MAMA ARC	123.0	CA E Z	11/1
Plato Center	NE	444.9750	+	W9ZS	VARA			10/1
Springfield	SPF	444.9750	+	N9YAY	N9YAY	210.7	CA E	11/0
Schaumburg	NE	919.9000	907.9000	KA9SUU	KA9SUU			11/1
Batavia	NE	1292.0000	1272.0000	W9XA	W9XA	88.5	L	10/1
Chicago	CHI	1292.1000	1272.1000	KD9FA	ACLR		AP E L	07/2
Springfield	SPF	1293.0000	1273.0000	N9JYC	N9EUO		E	12/0
Lisle	NE	1293.1000	1273.1000	WA9AEK	WA9AEK	114.8	CA	10/2

ATV

Location	Region	Output	Input	Callsign	Sponsor	CTCSS	Notes	Upd
Decatur	DEC	421.2500	439.2500	KD9D	CIATVU			12/0
Champaign	CHA	426.2500	439.2500	KA9SZX	KA9SZX			01/1

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Oregon	NW	443.9500	+	KB9DBG	KB9DBG	141.3	E	10/1
Chicago	CHI	443.9750	+	KB9PTI	AIRA	114.8		11/0
Mascoutah	STL	443.9750	+	AA9ME	AA9ME		L	10/2
Stockton	NW	443.9750	+	N9NIX	N9NIX	88.5		12/2
Chicago	CHI	444.0000	+	W9OWV	C.U.B.E.S.		CA E	02/1
Pekin	PIA	444.0000	+	KA9GCI	PEKIN RPTG	103.5	AP Z	01/1
Algonquin	NE	444.0250	+	N9IVM	N9IVM	103.5		10/2
Jonesboro	SC	444.0250	+	K9DMG	K9DMG			10/2
Sterling	NC	444.0250	-	N9JWI	N9JWI	82.5	[illegible]	
Wheaton	NE	444.0500	+	WA9E	TARC	114.8	E	01/0
McHenry	NE	444.0750	+	KB9I	KB9I			11/0
Batavia	NE	444.1000	+	KA9LFU	ELFAR			10/2
Champaign	CHA	444.1000	+	K9SI	K9SI	103.5	E L	04/2
Springfield	SPF	444.1000	+	W9TNG	PIONEER AR		CA	11/0
Elgin	NE	444.1250	+	K9UJH	K9UJH	114.8		12/1
Berwyn	NE	444.1500	+	WA9HIR	WA9HIR	146.2		12/0
Princeton	NC	444.1500	+	N9ECQ	N9ECQ	103.5	CA E Z	02/1
Crystal Lake	NE	444.1750	+	KA9ATL	KA9ATL	114.8		03/2
Decatur	DEC	444.1750	+	N9YAY	N9YAY	210.7	E WX L	11/0
Warrenville	NE	444.2000	+	WD9DAU	TFAR	114.8	E L	11/2
Batavia	NE	444.2250	+	WB9IKJ	FERMILAB	114.8		10/1
Mascoutah	STL	444.2250	+	AA9ME	AA9ME		L	10/2
Lombard	NC	444.2500	+	N9ECQ	CDES	114.8	CA E L Z	02/1
Murrayville	SPF	444.2500	+	N9YAY	N9YAY	210.7		11/0
Lovington	DEC	444.2750	+	WC9V	+N9GRL	103.5	E	01/0
Wheaton	NE	444.2750	+	KA9KDC	KA9KDC	114.8	CA E L	01/0
Aurora	NE	444.3000	+	W9CEQ	FRRL, INC.	114.8	E	11/0
Belleville	STL	444.3000	+	N9NJX	N9NJX	141.3		10/2
Macomb	WC	444.3000	+	WB9TEA	LEARC		AP	01/2
Monmouth	WC	444.3250	+	W9XYZ	W9XYZ	173.8		10/2
Wheeling	NE	444.3250	+	WB9OUF	WB9OUF	114.8		01/0
Bloomington	BLM	444.3500	+	W9EX	W9EX	107.2	E	10/2
Rockford	RFD	444.3500	+	K9AMJ	K9AMJ		CA E L	01/0
West Frankfort	S	444.3500	+	N9ZDZ	N9ZDZ			04/2
Arcola	EC	444.3750	+	WA9WOB	ARC NET	192.8		10/1
Chicago	CHI	444.3750	+	K9GFY	SARA	114.8	CA Z	10/2
Peoria	PIA	444.3750	+	N9BBO	N9BBO	156.7	CA E	10/1
Lake Villa	NE	444.4000	+	WB9RKD	WB9RKD	114.8	AP E L Z	11/0
New Lenox	NE	444.4000	+	N2BJ	N2BJ	141.3	L	11/0
Springfield	SPF	444.4000	+	K9CZ	K9CZ	103.5		12/1
Calumet City	NE	444.4250	+	KA9QPN	CC ESDA	114.8	E	11/0
Caseyville	STL	444.4250	+	N9BNR	N9BNR		CA E L	02/2
Dekalb	NE	444.4500	+	WB9DOM	WB9DOM	114.8	CA E	11/2
Galesburg	WC	444.4500	+	W9GFD	KNOXCARC		L	11/0
Litchfield	C	444.4500	+	AC9P	AC9P			11/2

Downers Grove	NE	444.4750	+	W9CCU	WCRA	114.8		11/0
Chicago	CHI	444.5000	+	K9PW	CARP			12/1
East Moline	NW	444.5000	+	K9JL	K9JL	146.2		12/1
Schaumburg	NE	444.5000	+	K9PW	CARP			12/1
Springfield	SPF	444.5000	+	N9EUO	N9EUO	103.5	AP E	03/0
Champaign	CHA	444.5250	+	K9BF	K9BF	103.5	E IRLP	10/1
St. Charles	NE	444.5250	+	KB9RYA	KCARS	114.8		10/1
Joliet	NE	444.5500	+	WW9AE	PRL WCEMA	114.8	E WX RACES ARES	11/0
Tremont	[illegible]	444.5500	+	W9TAZ	TCARS		E [Under Const.]	
Bellwood	NE	444.5750	+	KC9ZI	KC9ZI	114.8		11/2
Troy	STL	444.5750	+	AA9MZ	AA9MZ		AP L	10/2
Hampshire	NE	444.6000	+	K8IE	HAHAMS			01/0
Belleville	STL	444.6250	+	K9GXU	STCARC			11/1
Chicago	CHI	444.6250	+	N9SHB	N9SHB	110.9		10/1
Watseka	EC	444.6250	+	W9QKF	W9QKF	103.5		10/1
Champaign	CHA	444.6500	+	W9YH	SYNTON ARC	103.5		12/1
Freeport	NC	444.6500	+	WI9K	KA9DNO		AP E	03/2
Hickory Hills	NE	444.6500	+	W9VGE	W9VGE	203.5	CA L	11/1
Hampshire	NE	444.6750	+	W8ZS	SKYHAWK	114.8	CA E L Z	10/1
Jacksonville	SPF	444.6750	+	K9JX	JARS		CA E Z	04/1
Hampshire	NE	444.7000	+	W8ZS	SKYHAWK	114.8	L	10/1
Waterloo	STL	444.7000	+	N9OMD	N9OMD	136.5	AP E Z	11/1
Canton	PIA	444.7250	+	K9ILS	FCARC	103.5	E	01/1
Chicago	CHI	444.7250	+	W9TMC	TMC ARC			04/0
Rockford	NE	444.7250	+	N9MCS	N9MCS	114.8		10/1
Chicago	CHI	444.7750	+	WA9PAC	TELPIONEER	114.8	CA	10/1
Dixon	NC	444.8000	+	W9DXN	RRARC	114.8		10/1
Freeburg	STL	444.8000	+	WA9YDK	WA9YDK			12/0
Kankakee	NE	444.8000	+	W9AZ	KARS	114.8	AP E	11/0
Mt. Zion	C	444.8000	+	KO9I	+N9FNT	103.5	CA E	10/2
Schaumburg	NE	444.8000	+	KB2MAU	RAYJACK	203.5		03/1
Crystal Lake	[illegible]	444.8250		[illegible]	KA9FUR	123.0	E L [Under Const.]	
Orland Park	NE	444.8500	+	WD9HGO	WD9HGO			10/1
Rockford	RFD	444.8500	+	K9AMJ	K9AMJ		CA E L	01/0
Geneseo	NW	444.8750	+	W9MVG	SHAFER MEM	136.5	E	10/1
Granite City	STL	444.8750	+	KF9BN	KF9BN			12/2
Roselle	NE	444.8750	+	KA9LOY	NIPSARS	114.8	CA E L	11/1
Oak Lawn	NE	444.9000	+	W9OAR	W9OAR	114.8	CA E Z	10/1
Rock Island	NW	444.9000	+	W9WRL	QCRPTG		E	01/0
[illegible]	[illegible]	444.9000		K9KGO	K9KGO	[illegible]	AP [Under Const.]	10/1
Athens	SPF	444.9250	+	N9YAY	N9YAY	210.7		11/0
Carthage	WC	444.9250	+	N9YAY	N9YAY	210.7		11/0
Mattoon	SC	444.9250	+	W9MBD	HWKNOEBEL	103.5		01/0
Wasco	NE	444.9250	+	WA9IMB	WA9IMB	114.8	E	12/2
Collinsville	STL	444.9500	+	W9UH	W9UH			10/1

November 23, 2002

The WISCONSIN ASSOCIATION OF REPEATERS is an organisation of trustees and representatives of repeaters, state-wide, whose goal is mutual cooperation on the VHF and UHF spectrum, in the voluntary spirit of Amateur Radio.

Frequency Coordinator
Dave Karr, KA9FUR
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Waukesha, WI 53189-9392
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O	Open/Carrier Access	WX	Weather Net
C	Closed Access	L	Link and/or Crossband
AP	Autopatch	X	Wide Area Coverage
CA	Closed Autopatch	LiTZ	Long Tone Zero
DS	Dual Squelch	P	Portable
E	Emergency Power	Z	Autopatch to Law Enforcement

City	Rg	Output	Call	Sponsor	CTCSS	Access
Abrams	NE	146.8350	KB9DSV	KB9DSV	107.2	O AP E ARES
Adams	NC	145.2900	KB9JYT	ACARC		O E WX
Allenton	SE	442.3500	N9GMT	FM38	114.8	O DS AP E L X Z
Antigo	NC	145.3100	KD9HH	KD9HH	114.8	O AP E WX Z
Antigo	NC	147.2550	N9TEV	N9TEV	114.8	O AP E TT Z
Appleton	NE	145.1500	KF9CS	O CO RED+		O E P ARES
Appleton	NE	145.3300	W9RIC	F V VHF A	100.0	O
Appleton	NE	146.6550	KB9ENO	ECR LTD	107.2	O AP E WX P RACES ARES Z SKYWARN
Appleton	NE	146.7600	K9OQO	F V VHF A	100.0	O DS E X RACES ARES
Appleton	NE	442.1750	W9RIC	W9RIC	100.0	O CA E
Appleton	NE	443.6500	W9IEI	F V VHF		O RACES
Appleton	NE	1282.2000	N9QZD	N9QZD		O
Ashland	NW	147.3150	W9BCY	NARC		O CA E WX L ARES TT
Balsam Lake	NW	147.1950	N9QFW	N9QFW	110.9	O E WX RACES ARES
Baraboo	SC	146.8800	WR9ABE	C.W.R.A.	123.0	O DS E WX X ARES
Baraboo	SC	147.3150	WB9FDZ	YTARC	123.0	O E WX X RACES ARES
Baraboo	SC	443.9000	N9QIP	W.I.N.	100.0	O E WX L X RACES ARES
Bayfield	NW	146.6100	W9BCY	NARC		O CA E WX L X ARES
Beldenville	NW	147.2250	N0NIC	B.A.T.S.	110.9	O AP E P
Beldenville	NW	224.8400	N0NIC	B.A.T.S.	110.9	O AP E P
Beldenville	NW	443.2250	N0NIC	B.A.T.S.	110.9	O AP E P
Beloit	SC	146.6700	WA9JLD	Beloit ARC	123.0	O E RACES TT *77 for Carrier
Beloit	SC	224.3000	N9BUL	C.B.S. RG		O AP
Berlin	SC	145.2100	N9PAA	N9PAA	123.0	O E X
Big Flats	NC	146.6250	N9WYQ	N9WYQ	123.0	O E TT
Big Flats	NC	444.7250	N9WYQ	N9WYQ	114.8	O E RACES
Black River Falls	NE	443.6000	N9JCX	N9JCX	114.8	O DS E Part Time, Solar Powered
Bluff Siding	SW	146.8350	WB0BDI	WINON ARC		O E
Burlington	SE	442.8500	N9RNA	N9RNA	88.5	O
Caledonia	SE	442.5000	WE9EE	WE9EE	114.8	O
Cambridge	SC	147.3600	W9CRA	CARA	123.0	O WX X RACES ARES
Cambridge	SE	443.0000	KA9FUR	KA9FUR	123.0	O L
Carlsville	NE	146.7300	W9AIQ	DOOR CO	107.2	O E RACES ARES
Cedarburg	SE	146.9700	W9CQO	O.R.C.	127.3	O CA X Z
Cedarburg	SE	442.1000	K9QLP	CFD	127.3	O E
Chippewa Falls	NW	147.3750	WD9HFT	WD9HFT	110.9	O DS X
Chippewa Falls	NW	442.3000	WD9HFT	WD9HFT	110.9	O DS
Chippewa Falls	NW	444.0000	WD9HFT	WD9HFT	110.9	O X
Cleveland	NE	444.1750	K9SJ	K9SJ ARES	107.2	O E WX L RACES ARES
Clinton	SC	53.1900	WB9BJU	C.A.T.S.	123.0	O E
Clinton	SC	146.7150	K9RIJ	C.A.T.S.	123.0	O E RACES ARES TT
Clinton	SC	443.1750	K9RIJ	C.A.T.S.	123.0	O E RACES ARES
Colfax	NW	444.3500	WA9PAM	WA9PAM	110.9	O
Crivitz	NE	145.4700	K9ARF	ATHELSTAN	107.2	O DS TT *88 Radio Check
Cudahy	SE	224.9000	NK9G	NK9G		O AP L Z
Delafield	SE	146.8200	K9ABC	SEWFARS	127.3	O CA E WX L X ARES Z
Delafield	SE	444.1250	K9ABC	SEWFARS	114.8	O CA E Z
Eagle River	NC	145.3900	KD9PT	KD9PT		O DS CA E Z 911
Earl	NW	145.1100	N9MMU	N.V.W.A.	110.9	O E WX L RACES ARES
Eau Claire	NW	146.9100	W9EAU	E C ARC	110.9	O DS AP E WX ARES Z
Eau Claire	NW	147.2400	W9EAU	E C ARC	110.9	O DS AP E
Eau Claire	NW	223.8200	N9RSU	N9RSU	67.0	O AP TT Z 911
Eau Claire	NW	443.3000	KB9R	KB9R	110.9	O E
Eau Galle	SW	146.6850	KB9LUK	KB9LUK	110.9	O
Edgerton	SC	442.3000	N9QIP	W.I.N.	123.0	O E WX L X RACES ARES
Elkhorn	SE	146.8650	KB9LBR	LAARC	127.3	O CA E WX RACES ARES
Exeland	NW	444.8500	KD9FC	N9EGE	110.9	O
Fitchburg	SC	444.0000	KA9VDU	KA9VDU	123.0	O X
Fond Du Lac	NE	145.4300	K9IA	F.A.R.A	107.2	O E WX
Fond Du Lac	NE	147.0900	K9DJB	FDL RPT	107.2	O E WX RACES ARES
Fond du Lac	NE	442.4000	N9QIP	W.I.N.	107.2	O E L X RACES ARES
Fort Atkinson	SC	53.0900	AA9AD	S.W.R.G.	103.5	O WX L X
Fort Atkinson	SC	145.4900	WB9EMR	TCARC		O AP E WX ARES TT Z
Fort Atkinson	SC	224.4200	N9DTT	FT AT RG	123.0	O AP E WX ARES TT Z
Franksville	SE	223.8000	K9DQ	K9DQ	127.3	O
Friendship	SC	147.0300	W9EIL	N9TD	123.0	O
Galesville	SW	147.0000	N9QIP	N9QIP	110.9	O AP E WX X RACES ARES Z 911
Galesville	SW	442.5000	N9QIP	N9QIP	100.0	O E WX L X RACES ARES TT
Genoa City	SE	443.9250	K9XN	LAKCARS	114.8	O
Germantown	SE	224.1800	W9CQO	O.R.C.		O E
Germantown	SE	444.5250	WD9IEV	WD9IEV	114.8	O
Granton	NC	146.7750	N9RRF	N9RRF	162.2	O AP E WX
Green Bay	NE	146.6850	KB9GKC	KB9GKC	107.2	O
Green Bay	NE	147.0750	N9DKH	AHSTC	107.2	O DS CA E LiTZ
Green Bay	NE	147.1200	K9GB	G B M&K	107.2	O CA E WX X Z
Green Bay	NE	147.2700	KB9ALN	PASS	107.2	O E WX L Linked to 145.110
Green Bay	NE	147.3600	K9EAM	G B M&K		O AP E Z
Green Bay	NE	223.9400	K9JQE	K9JQE	107.2	O DS E
Green Bay	NE	443.5000	KB9AMM	TEARUG	107.2	O DS CA E L
Green Bay	NE	443.7500	N9IIE	NEWRL		O L Linked to 146.685
Green Bay	NE	444.7750	K9EAM	G B M&K	107.2	O CA E X Z
Hales Corners	SE	147.3900	N9CFK	N9CFK	151.4	O
Hartford	SE	147.2850	N9LLT	K9MLD	103.5	O
Hayward	NW	147.2550	N9MMU	NVWA	110.9	O AP E WX L X RACES ARES Z
Hilbert	NE	53.1700	KN9P	C.A.R.E.S.		O RACES ARES
Hilbert	NE	146.8950	N9OBG	N9OBG	146.2	O AP
Hixton	SW	146.9400	KC9YE	T-J RA		O X
Holcombe	NW	52.8100	N9LIE	N9LIE	110.9	O L X
Holcombe	NW	145.4700	N9LIE	N9LIE	110.9	O L X
Holcombe	NW	147.3450	N9MMU	N.V.W.A.	136.5	O E WX L RACES ARES
Holcombe	NW	444.5250	N9LIE	N9LIE	110.9	O L X
Hollandale	SC	146.6550	KB9AKM	HVARC	123.0	O E
Hollandale	SC	444.5500	N9QIP	N9QIP/WIN	123.0	O E WX L X RACES ARES
Howard	NE	444.2000	KC9AAJ	KC9AAJ	118.8	C AP
Hubertus	SE	146.8500	W9KHO	K9JAC	127.3	O CA
Hubertus	SE	443.1500	K9JAC	K9JAC	127.3	O CA
Hudson	NW	145.1300	K9ZMA	SCC RACES		O CA E RACES
Hudson	NW	146.9550	K0LAV	K0LAV		O L TTON787 TTOFF1787
Hudson	NW	444.9250	N9NGH	N9NGH	110.9	O E
Iola	NC	146.9250	WB9GBG	WB9GBG	114.8	O AP E WX L RACES ARES
Irma	NC	146.9700	KC9NW	KC9NW	71.9	O CA
Ixonia	SE	442.0250	WA9YVE	N9JUU	114.8	O E RACES ARES
Janesville	SC	145.4500	WD9ACY	R.A.T.S.		O AP E WX TT
Janesville	SC	147.0750	K9FRY	K9FRY	123.0	O AP
Juneau	SC	146.6400	W9TCH	ROCK R RC	123.0	O AP E WX L RACES ARES Z 911
Kaukauna	NE	444.4500	ND9Z	ND9Z	107.2	O CA TT

Kenosha	SE	224.8000	K9RI	K.A.R.S.	127.3	O	AP E WX X RACES ARES Z 911, Wx Ale
Kenosha	SE	442.2000	N9OIG	N9OIG	114.8	O	DS L X
Kewaskum	SE	444.2750	N9NLU	N9NLU	127.3	O	E
Kewaunee	NE	146.8050	WB9RJB	WB9RJB	107.2	O	E WX
La Crosse	SW	146.7600	K9CUT	LaCrossRA		O	
La Crosse	SW	146.9700	WR9ARC	RVRLND ARC		O	AP E WX X ARES Z 911
La Crosse	SW	147.0900	N9ETD	N9ETD		O	
La Crosse	SW	444.4750	WR9ARC	RARC		O	AP
La Crosse	SW	444.6000	N9ETD	MRARA		O	
Lac Du Flambea	NC	146.6700	N9AFN	N9AFN	107.2	O	
Lac Du Flambea	NC	146.7000	W9BTN	W9BTN	114.8	O	
Lodi	SC	147.2250	WB9YXU	WB9YXU	123.0	O	E
Lohrville	SC	145.2700	KB9JJB	KB9JJB	123.0	O	DS
Madison	SC	53.0700	N9KAN	S.W.R.G.	103.5	O	CA X RACES Z 911 1MHz split
Madison	SC	146.6850	W9YT	UW BARS	123.0	O	E
Madison	SC	146.7600	W9HSY	M A R A	123.0	O	DS CA E X Z
Madison	SC	146.9400	WR9ABE	C W R A	123.0	O	DS AP
Madison	SC	147.1500	W9HSY	M A R A	123.0	O	DS CA E X Z
Madison	SC	224.1600	WB9RSQ	WB9RSQ	123.0	O	AP L Z
Madison	SC	443.4000	N9KAN	S.W.R.G.	123.0	O	AP CA E L X Z 911
Madison	SC	444.3750	KB9DRZ	KB9DRZ	123.0	O	E L X
Madison	SC	444.5000	WB9TAE	WB9TAE	123.0	O	DS CA E
Madison	SC	444.7750	NG9V	NG9V	123.0	O	DS DX Traffic
Manitowoc	NE	145.1900	WB9MFB	WB9MFB	107.2	O	E WX X RACES ARES
Manitowoc	NE	146.6100	W9DK	MANCORAD	107.2	O	CA E WX RACES ARES Z
Manitowoc	NE	147.0300	N9GHE	N9GHE	110.9	O	AP RACES ARES Z
Manitowoc	NE	224.5400	N9GHE	N9GHE		O	RACES ARES
Manitowoc	NE	443.9750	N9GHE	N9GHE		O	AP RACES ARES Z
Markesan	SC	146.9550	K9WC	G FOX ARC		O	E WX
Markesan	SC	444.4000	K9WC	G FOX ARC		O	
Marshfield	NC	147.1800	KC9AAR	M.A.A.R.S.	114.8	O	AP E Z 911
Marshfield	NC	444.9750	KC9AAR	M.A.A.R.S.		O	E ARES
Mauston	NC	146.8500	KB9WQF	ARC OF CW		O	E WX RACES ARES
Melrose	SW	145.4500	W9LLB	W9LLB	110.9	O	E
Menomonie	NW	146.6100	K9KGB	R CDR RA		O	AP E WX L X ARES Z 911
Menomonie	NW	146.8050	N9HNI	N9HNI		O	CA
Mequon	SE	53.0100	N9PMR	N9PMR	103.5	O	DS E
Mequon	SE	443.3250	N9PMR	N9PMR	127.3	O	
Merrill	NC	145.1900	KX2DX	M.A.R.G	114.8	O	E
Merton	SE	444.6250	W9JPE	W9JPE	127.3	O	DS E L
Milton	SC	444.7500	WB9BJU	WB9BJU	123.0	O	
Milwaukee	SE	53.0300	W9DHI	WERA	103.5	O	E L 1MHz split
Milwaukee	SE	145.1300	N9LKH	MAARS	127.3	O	CA E WX L X RACES ARES Z Backbone
Milwaukee	SE	145.2500	KA9WXN	UW-M ARC	127.3	O	DS
Milwaukee	SE	145.3900	WB0AFB	MATC RC	127.3	O	DS
Milwaukee	SE	146.6250	N9BMH	N9BMH	127.3	O	TT
Milwaukee	SE	146.6700	W9WK	AREC, INC.	127.3	O	AP E WX L X RACES ARES Z
Milwaukee	SE	146.7900	W9HHX	MSOE ARC	127.3	O	
Milwaukee	SE	146.9100	K9IZV	MKE RPTR	127.3	O	DS AP E WX X Z
Milwaukee	SE	147.0000	W9PY	PHANTOM	146.2	O	AP
Milwaukee	SE	147.0450	W9RH	M.R.A.C.	127.3	O	
Milwaukee	SE	147.1050	K9IFF	K9IFF	127.3	C	CA E TT
Milwaukee	SE	147.1650	WB9SDD	WB9SDD	127.3	O	E
Milwaukee	SE	442.4250	N9UUR	N9UUR	127.3	O	E SSTV OK
Milwaukee	SE	442.4750	KF9RU	KF9RU	127.3	O	AP E
Milwaukee	SE	443.0250	KB9UIZ	W9DWP	114.8	O	L
Milwaukee	SE	443.0500	N9OSK	N9OSK	100.0	O	DS WX
Milwaukee	SE	443.5500	N9LKH	N9LKH	127.3	O	E
Milwaukee	SE	443.8000	N9GMT	FM38	114.8	O	DS AP E L X Z
Milwaukee	SE	444.3250	N9CFG	W.E.R.A.	127.3	O	E
Milwaukee	SE	444.4500	KA9QMD	KA9QMD	114.8	O	AP
Milwaukee	SE	444.8500	W9DHI	WERA	127.3	C	CA E L X
Milwaukee	SE	444.8750	W9DHI	WERA	127.3	O	E X
Milwaukee	SE	444.9250	N9NGI	N9NGI	127.3	O	CA Z
Monroe	SC	145.1100	NR9W	G C ARA	114.8	O	E
Mount Sterling	SW	147.3600	W9DMH	W9DMH		O	E WX
Necedah	SC	147.1050	K9UJH	K9UJH	123.0	O	E
Necedah	SC	444.1250	K9UJH	K9UJH	123.0	O	E
New Berlin	SE	224.9600	WD9EUF	WD9EUF	127.3	O	
New Berlin	SE	443.3000	W9LR	W9LR	127.3	O	
New Holstein	NE	147.3000	KA9OJN	C.A.R.E.S		O	E WX RACES ARES
New London	NC	145.4100	KB9QWC	KB9QWC	114.8	O	CA
New Richmond	NW	145.2700	N9LIE	N9LIE	110.9	O	L X
New Richmond	NW	444.6750	N9LIE	N9LIE	110.9	O	L X
Nokomis	NC	147.0150	KB9QVB	KB9QVB	114.8	O	AP E P TT
North Freedom	SC	443.6750	KD9UU	S.W.R.G.	114.8	O	WX L X
North Prarie	SE	444.1500	KA9FUR	KA9FUR	123.0	O	L
Oshkosh	NE	147.2400	KA9JAC	WIN CTY E		O	CA E WX RACES ARES Z
Oshkosh	NE	147.3450	N9GDY	SOLAR	107.2	O	AP E Z 911*
Oshkosh	NE	223.9000	W9OSH	W9OSH	107.2	O	
Oshkosh	NE	442.0750	N9GDY	SOLAR	107.2	O	AP E Z 911*
Osseo	NC	145.3300	N9LIE	N9LIE	110.9	O	L X
Osseo	NC	444.2000	N9LIE	N9LIE	110.9	O	L X
Park Falls	NC	147.0000	KA9EOK	PRICE CRA	110.9	O	E WX RACES ARES
Park Falls	NC	444.7500	KA9EOK	PRICE CRA		O	E WX RACES ARES
Pepin	NW	145.3500	KB9S	WAB ARS		O	E
Plymouth	NE	147.0600	WE9R	SHEB ARC	107.2	O	
Plymouth	NE	443.2250	KD9TZ	S CTY 440	107.2	O	E WX
Plymouth	NE	444.3500	WE9R	WERA	114.8	O	E X
Port Washington	SE	147.3300	WB9RQR	OZARES	127.3	O	CA E WX X RACES ARES Z 911
Port Washington	SE	443.5250	WB9RQR	OZARES	114.8	O	CA E WX RACES ARES Z 911
Port Washington	SE	443.7500	W9CQO	O.R.C.	127.3	O	CA E X Z
Portage	SC	224.6600	KE9KX	KE9KX		O	X TT
Praire Du Sac	SC	444.2500	N9KXX	BSRG	123.0	O	E
Prentice	NC	146.6850	W9ALS	W9ALS	114.8	O	AP E L Z 911
Prentice	NC	146.8950	W9ALS	W9ALS	114.8	O	AP E WX L X Z 911
Prentice	NC	443.8000	W9ALS	W9ALS	114.8	O	AP E WX L Z 911
Princeton	SE	444.9500	N9GMT	FM38	100.0	O	E L X
Racine	SE	147.2700	KR9RK	LRA Racine		O	E WX ARES TT
Racine	SE	442.0000	KR9RK	LRA Racine	127.3	O	WX ARES
Racine	SE	444.0500	KA9LOK	KA9LOK	114.8	O	
Rhinelander	NC	145.2100	W9BHL	NWARC	114.8	O	E WX L ARES Linked to Sayner 5.13
Rhinelander	NC	146.9400	W9ZZZ	RHIN RP A		O	AP E WX X RACES ARES Z
Rice Lake	NW	146.7150	WB9PRI	WB9PRI		O	WX
Rice Lake	NW	147.0300	WB9WFG	WB9WFG	110.9	O	
Rice Lake	NW	443.6500	W9GDH	ARC2	110.9	O	E
Richland Center	SW	146.9100	WB9SLI	P V RP A	131.8	O	
River Falls	NW	443.0250	N9QIP	W.I.N.	110.9	O	E L X RACES ARES TT
Roberts	NW	147.3300	KA9YRV	SCVRA	110.9	O	
Rubicon	SC	145.3500	WB9KPG	WB9KPG		O	E
Sayner	NC	145.1300	KB9CBL	NWARC	114.8	O	E WX L Linked to 145.210
Shawano	NC	145.3500	KA9NWY	KA9NWY	114.8	O	E WX X RACES
Sheboygan	NE	147.2550	N9REH	N9REH	127.3	O	DS AP E L
Sheboygan	NE	442.9000	AC9A	AC9A	107.2	O	
Sheboygan	NE	444.6000	N9REH	N9REH	114.8	O	DS AP E L
Shell Lake	NW	147.0450	N9PHS	NORWESCO	110.9	O	E WX L X RACES ARES Linked to 146.
Shell Lake	NW	442.1500	N9PHS	NORWESCO	110.9	O	E WX P RACES ARES
Siren	NW	146.6250	N9PHS	NORWESCO	110.9	O	E WX L X RACES ARES Linked to 147.
Sister Bay	NE	147.1800	W9AIQ	DC ARC	107.2	O	CA E
Solon Springs	NW	145.4900	N9QWH	DC RACES	110.9	O	AP E WX L X RACES ARES Z 911
Spooner	NW	147.1350	W9AEA	W9AEA		O	L
Spooner	NW	444.8000	W9AEA	W9AEA		O	L
Spooner/Hertel	NW	145.1900	KB9OHN	BARS		O	CA E L Z 911
Spooner/Hertel	NW	147.3000	KB9OHN	BARS	110.9	O	CA E L Z 911
Spooner/Hertel	NW	224.5000	KB9OHN	BARS		O	AP E L Z 911
Spooner/Hertel	NW	443.5000	KB9OHN	BARS		C	AP E L Z 911
St. Lawrence	SE	146.7300	WB9BVB	W.C. ARC	127.3	O	WX RACES ARES
Stevens Point	NC	146.6700	K9UW	CWRA LTD	114.8	O	AP E Z
Stevens Point	NC	146.9850	W9NN	CWRA LTD		O	AP E WX TT Z
Stevens Point	NC	444.7000	KC9NW	KC9NW		O	CA E L

Sturgeon Bay	NE	147.2100	W9AIQ	DC ARC		O	AP CA E X Z 911
Sturgeon Bay	NE	444.0000	K9KJM	K9KJM	107.2	O	
Sturgeon Bay	NE	920.0000	K9KJM	K9KJM		O	
Sturgeon Bay	NE	1282.1000	K9KJM	K9KJM		O	Experimental
Superior	NW	146.7600	KB9VPA	UWS-ARC		O	AP E
Superior	NW	146.8200	WA9VDW	T P T G	203.5	O	DS AP
Superior	NW	444.9000	WA9KLM	WITC ARC		O	AP E
Three Lakes	NE	147.1950	N9GHE	N9GHE	114.8	O	RACES ARES
Tomah	SW	145.3900	N9BOE	N9BOE	131.8	O	DS CA E WX X Z 911, '#' Down
Tomah	SW	444.8000	N9QIP	W.I.N.	110.9	O	E L X RACES ARES
Tomah	SW	444.8500	KB9EBX	KB9EBX	167.9	O	
Tomahawk	NC	52.8300	N9MEA	N9MEA	114.8	O	E L X
Tomahawk	NC	145.4300	N9CLE	TOM RP A	114.8	O	AP E WX X ARES Z 911
Tomahawk	NC	223.7600	N9CLE	TOM RP A	114.8	O	E
Tomahawk	NC	444.5750	N9CLE	TOM RPT A		O	
Town of Hill	NC	147.0900	N0GMJ	N0GMJ	114.8	O	DS E X ARES NOAA Wx Radio
Trevor	SE	442.6000	KA9VZD	KA9VZD	114.8	O	E L
Union Grove	SE	146.7450	N9OIG	N9OIG	127.3	O	E
Union Grove	SE	442.2500	N9OIG	N9OIG	114.8	O	L X
Verona	SC	442.1000	KA9VDU	KA9VDU	123.0	O	
Wabeno	NE	145.1100	KF9DB	PASS	107.2	O	E WX L Linked to 147.270
Waukesha	SE	444.6500	KA9FUR	KA9FUR	127.3	O	
Waupaca	NC	147.3900	WA9FDC	WARC		O	WX X
Waupaca	NC	444.9000	N5IIA	N5IIA	114.8	O	L Linked to 146.670
Wausau	NC	52.8900	W9SM	W.V.R.A.	114.8	O	DS E ARES
Wausau	NC	53.4500	KC9NW	R.M.R.A.	103.5	O	X
Wausau	NC	146.6400	W9SM	W.V.R.A.	114.8	O	DS AP E WX L X ARES Z 911
Wausau	NC	146.8200	KC9NW	R.M.R.A.	114.8	O	DS AP E WX L X ARES Z 911
Wausau	NC	147.0600	KC9NW	KC9NW	71.9	O	E X
Wausau	NC	224.6400	W9SM	W.V.R.A.	114.8	O	DS AP E L X ARES Z 911
Wausau	NC	442.2000	N9QIP	N9QIP	114.8	O	E L X RACES ARES
Wausau	NC	443.3250	KA9HQE	KA9HQE	100.0	O	CA
Wausau	NC	443.7500	KC9NW	KC9NW	71.9	O	CA E WX L X ARES Z
Wausau	NC	443.9500	KC9NW	KC9NW	114.8	O	CA E X
Wausau	NC	444.1000	W9SM	W9SM	114.8	O	DS AP E WX L X Z 911
Wausau	NC	444.3000	KC9NW	R.M.R.A.	114.8	O	CA E X
Wausau	NC	918.0000	KC9NW	R.M.R.A.		O	E X
West Allis	SE	145.1700	W9FK	WARAC		O	
West Allis	SE	224.5200	KA9JCP	KA9JCP		O	AP
West Bend	SE	223.8200	KA9UCU	KA9UCU	114.8	O	
West Milwaukee	SE	147.1350	NY9T	Viking Com	141.3	O	
Winneconne	NE	224.5000	KB9IE	P.G.R.A.		O	L X TT
Wis Rapids	NC	146.7900	W9DQA	MIDST RA	114.8	O	AP CA E X RACES ARES Z 911
Wis Rapids	NC	147.3300	K9PJB	WI AIR RA	114.8	O	

-- ATV --

Baraboo	SC	421.2500	KB9SFS	B.A.T.S.		O	ATV -- Input 923.25
Baraboo	SC	421.2500	KB9SFS	B.A.T.S.		O	ATV -- Input 1252
Wausau	NC	421.2500	KB9RFT	RMATS		O	E L X RACES ARES Input 915MHz
Wausau	NC	915.0000	KB9RFT	RMATS		O	E L X ARES FM-ATV -- Input 1.25GHz
Wausau	NC	1250.0000	KB9RFT	RMATS		O	E L X ARES FM-ATV -- Input 915 MHz

November 23, 2002

The WISCONSIN ASSOCIATION OF REPEATERS is an organisation of trustees and representatives of repeaters, state-wide, whose goal is mutual cooperation on the VHF and UHF spectrum, in the voluntary spirit of Amateur Radio.

Frequency Coordinator
Dave Karr, KA9FUR
S64 W24740 Susan St.
Waukesha, WI 53189-9392
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O	Open/Carrier Access	WX	Weather Net
C	Closed Access	L	Link and/or Crossband
AP	Autopatch	X	Wide Area Coverage
CA	Closed Autopatch	LiTZ	Long Tone Zero
DS	Dual Squelch	P	Portable
E	Emergency Power	Z	Autopatch to Law Enforcement

City	Rg	Output	Call	Sponsor	CTCSS	Access
Holcombe	NW	52.8100	N9LIE	N9LIE	110.9	O L X
Tomahawk	NC	52.8300	N9MEA	N9MEA	114.8	O E L X
Wausau	NC	52.8900	W9SM	W.V.R.A.	114.8	O DS E ARES
Mequon	SE	53.0100	N9PMR	N9PMR	103.5	O DS E
Milwaukee	SE	53.0300	W9DHI	WERA	103.5	O E L 1MHz split
Madison	SC	53.0700	N9KAN	S.W.R.G.	103.5	O CA X RACES Z 911 1MHz split
Fort Atkinson	SC	53.0900	AA9AD	S.W.R.G.	103.5	O WX L X
Hilbert	NE	53.1700	KN9P	C.A.R.E.S.		O RACES ARES
Clinton	SC	53.1900	WB9BJU	C.A.T.S.	123.0	O E
Wausau	NC	53.4500	KC9NW	R.M.R.A.	103.5	O X
Earl	NW	145.1100	N9MMU	N.V.W.A.	110.9	O E WX L RACES ARES
Monroe	SC	145.1100	NR9W	G C ARA	114.8	O E
Wabeno	NE	145.1100	KF9DB	PASS	107.2	O E WX L Linked to 147.270
Hudson	NW	145.1300	K9ZMA	SCC RACES		O CA E RACES
Milwaukee	SE	145.1300	N9LKH	MAARS	127.3	O CA E WX L X RACES ARES Z Backbone
Sayner	NC	145.1300	KB9CBL	NWARC	114.8	O E WX L Linked to 145.210
Appleton	NE	145.1500	KF9CS	O CO RED+		O E P ARES
West Allis	SE	145.1700	W9FK	WARAC		O
Manitowoc	NE	145.1900	WB9MFB	WB9MFB	107.2	O E WX X RACES ARES
Merrill	NC	145.1900	KX2DX	M.A.R.G	114.8	O E
Spooner/Hertel	NW	145.1900	KB9OHN	BARS		O CA E L Z 911
Berlin	SC	145.2100	N9PAA	N9PAA	123.0	O E X
Rhinelander	NC	145.2100	W9BHL	NWARC	114.8	O E WX L ARES Linked to Sayner 5.13
Milwaukee	SE	145.2500	KA9WXN	UW-M ARC	127.3	O DS
Lohrville	SC	145.2700	KB9JJB	KB9JJB	123.0	O DS
New Richmond	NW	145.2700	N9LIE	N9LIE	110.9	O L X
Adams	NC	145.2900	KB9JYT	ACARC		O E WX
Antigo	NC	145.3100	KD9HH	KD9HH	114.8	O AP E WX Z
Appleton	NE	145.3300	W9RIC	F V VHF A	100.0	O
Osseo	NC	145.3300	N9LIE	N9LIE	110.9	O L X
Pepin	NW	145.3500	KB9S	WAB ARS		O E
Rubicon	SC	145.3500	WB9KPG	WB9KPG		O E
Shawano	NC	145.3500	KA9NWY	KA9NWY	114.8	O E WX X RACES
Eagle River	NC	145.3900	KD9PT	KD9PT		O DS CA E Z 911
Milwaukee	SE	145.3900	WB0AFB	MATC RC	127.3	O DS
Tomah	SW	145.3900	N9BOE	N9BOE	131.8	O DS CA E WX X Z 911, '#' Down
New London	NC	145.4100	KB9QWC	KB9QWC	114.8	O CA
Fond Du Lac	NE	145.4300	K9IA	F.A.R.A	107.2	O E WX
Tomahawk	NC	145.4300	N9CLE	TOM RP A	114.8	O AP E WX X ARES Z 911
Janesville	SC	145.4500	WD9ACY	R.A.T.S.		O AP E WX TT
Melrose	SW	145.4500	W9LLB	W9LLB	110.9	O E
Crivitz	NE	145.4700	K9ARF	ATHELSTAN	107.2	O DS TT *88 Radio Check
Holcombe	NW	145.4700	N9LIE	N9LIE	110.9	O L X
Fort Atkinson	SC	145.4900	WB9EMR	TCARC		O AP E WX ARES TT Z
Solon Springs	NW	145.4900	N9QWH	DC RACES	110.9	O AP E WX L X RACES ARES Z 911
Bayfield	NW	146.6100	W9BCY	NARC		O CA E WX L X ARES
Manitowoc	NE	146.6100	W9DK	MANCORAD	107.2	O CA E WX RACES ARES Z
Menomonie	NW	146.6100	K9KGB	R CDR RA		O AP E WX L X ARES Z 911
Big Flats	NC	146.6250	N9WYQ	N9WYQ	123.0	O E TT
Milwaukee	SE	146.6250	N9BMH	N9BMH	127.3	O TT
Siren	NW	146.6250	N9PHS	NORWESCO	110.9	O E WX L X RACES ARES Linked to 147.
Juneau	SC	146.6400	W9TCH	ROCK R RC	123.0	O AP E WX L RACES ARES Z 911
Wausau	NC	146.6400	W9SM	W.V.R.A.	114.8	O DS AP E WX L X ARES Z 911
Appleton	NE	146.6550	KB9ENO	ECR LTD	107.2	O AP E WX P RACES ARES Z SKYWARN
Hollandale	SC	146.6550	KB9AKM	HVARC	123.0	O E
Beloit	SC	146.6700	WA9JLD	Beloit ARC	123.0	O E RACES TT *77 for Carrier
Lac Du Flambea	NC	146.6700	N9AFN	N9AFN	107.2	O
Milwaukee	SE	146.6700	W9WK	AREC, INC.	127.3	O AP E WX L X RACES ARES Z
Stevens Point	NC	146.6700	K9UW	CWRA LTD	114.8	O AP E Z
Eau Galle	SW	146.6850	KB9LUK	KB9LUK	110.9	O
Green Bay	NE	146.6850	KB9GKC	KB9GKC	107.2	O
Madison	SC	146.6850	W9YT	UW BARS	123.0	O E
Prentice	NC	146.6850	W9ALS	W9ALS	114.8	O AP E L Z 911
Lac Du Flambea	NC	146.7000	W9BTN	W9BTN	114.8	O
Clinton	SC	146.7150	K9RIJ	C.A.T.S.	123.0	O E RACES ARES TT
Rice Lake	NW	146.7150	WB9PRI	WB9PRI		O WX
Carlsville	NE	146.7300	W9AIQ	DOOR CO	107.2	O E RACES ARES
St. Lawrence	SE	146.7300	WB9BVB	W.C. ARC	127.3	O WX RACES ARES
Union Grove	SE	146.7450	N9OIG	N9OIG	127.3	O E
Appleton	NE	146.7600	K9OQO	F V VHF A	100.0	O DS E X RACES ARES
La Crosse	SW	146.7600	K9CUT	LaCrossRA		O
Madison	SC	146.7600	W9HSY	M A R A	123.0	O DS CA E X Z
Superior	NW	146.7600	KB9VPA	UWS-ARC		O AP E
Granton	NC	146.7750	N9RRF	N9RRF	162.2	O AP E WX
Milwaukee	SE	146.7900	W9HHX	MSOE ARC	127.3	O
Wis Rapids	NC	146.7900	W9DQA	MIDST RA	114.8	O AP CA E X RACES ARES Z 911
Kewaunee	NE	146.8050	WB9RJB	WB9RJB	107.2	O E WX
Menomonie	NW	146.8050	N9HNI	N9HNI		O CA
Delafield	SE	146.8200	K9ABC	SEWFARS	127.3	O CA E WX L X ARES Z
Superior	NW	146.8200	WA9VDW	T P T G	203.5	O DS AP
Wausau	NC	146.8200	KC9NW	R.M.R.A.	114.8	O DS AP E WX L X ARES Z 911
Abrams	NE	146.8350	KB9DSV	KB9DSV	107.2	O AP E ARES
Bluff Siding	SW	146.8350	WB0BDI	WINON ARC		O E
Hubertus	SE	146.8500	W9KHO	K9JAC	127.3	O CA
Mauston	NC	146.8500	KB9WQF	ARC OF CW		O E WX RACES ARES
Elkhorn	SE	146.8650	KB9LBR	LAARC	127.3	O CA E WX RACES ARES
Baraboo	SC	146.8800	WR9ABE	C.W.R.A.	123.0	O DS E WX X ARES
Hilbert	NE	146.8950	N9OBG	N9OBG	146.2	O AP
Prentice	NC	146.8950	W9ALS	W9ALS	114.8	O AP E WX L X Z 911
Eau Claire	NW	146.9100	W9EAU	E C ARC	110.9	O DS AP E WX ARES Z
Milwaukee	SE	146.9100	K9IZV	MKE RPTR	127.3	O DS AP E WX X Z
Richland Center	SW	146.9100	WB9SLI	P V RP A	131.8	O
Iola	NC	146.9250	WB9GBG	WB9GBG	114.8	O AP E WX L RACES ARES
Hixton	SW	146.9400	KC9YE	T-J RA		O X
Madison	SC	146.9400	WR9ABE	C W R A	123.0	O DS AP
Rhinelander	NC	146.9400	W9ZZZ	RHIN RP A		O AP E WX X RACES ARES Z
Hudson	NW	146.9550	K0LAV	K0LAV		O L TTON787 TTOFF1787
Markesan	SC	146.9550	K9WC	G FOX ARC		O E WX
Cedarburg	SE	146.9700	W9CQO	O.R.C.	127.3	O CA X Z
Irma	NC	146.9700	KC9NW	KC9NW	71.9	O CA
La Crosse	SW	146.9700	WR9ARC	RVRLND ARC		O AP E WX X ARES Z 911
Stevens Point	NC	146.9850	W9NN	CWRA LTD		O AP E WX TT Z
Galesville	SW	147.0000	N9QIP	N9QIP	110.9	O AP E WX X RACES ARES Z 911
Milwaukee	SE	147.0000	W9PY	PHANTOM	146.2	O AP
Park Falls	NC	147.0000	KA9EOK	PRICE CRA	110.9	O E WX RACES ARES
Nokomis	NC	147.0150	KB9QVB	KB9QVB	114.8	O AP E F TT

Friendship	SC	147.0300	W9EIL	N9TD	123.0	O	
Manitowoc	NE	147.0300	N9GHE	N9GHE	110.9	O	AP RACES ARES Z
Rice Lake	NW	147.0300	WB9WFG	WB9WFG	110.9	O	
Milwaukee	SE	147.0450	W9RH	M.R.A.C.	127.3	O	
Shell Lake	NW	147.0450	N9PHS	NORWESCO	110.9	O	E WX L X RACES ARES Linked to 146.
Plymouth	NE	147.0600	WE9R	SHEB ARC	107.2	O	
Wausau	NC	147.0600	KC9NW	KC9NW	71.9	O	E X
Green Bay	NE	147.0750	N9DKH	AHSTC	107.2	O	DS CA E LiTZ
Janesville	SC	147.0750	K9FRY	K9FRY	123.0	O	AP
Fond Du Lac	NE	147.0900	K9DJB	FDL RPT	107.2	O	E WX RACES ARES
La Crosse	SW	147.0900	N9ETD	N9ETD		O	
Town of Hill	NC	147.0900	N0GMJ	N0GMJ	114.8	O	DS E X ARES NOAA Wx Radio
Milwaukee	SE	147.1050	K9IFF	K9IFF	127.3	O	CA E TT
Necedah	SC	147.1050	K9UJH	K9UJH	123.0	O	E
Green Bay	NE	147.1200	K9GB	G B M&K	107.2	O	CA E WX X Z
Spooner	NW	147.1350	W9AEA	W9AEA		O	L
West Milwaukee	SE	147.1350	NY9T	Viking Com	141.3	O	
Madison	SC	147.1500	W9HSY	M A R A	123.0	O	DS CA E X Z
Milwaukee	SE	147.1650	WB9SDD	WB9SDD	127.3	O	E
Marshfield	NC	147.1800	KC9AAR	M.A.A.R.S.	114.8	O	AP E Z 911
Sister Bay	NE	147.1800	W9AIQ	DC ARC	107.2	O	CA E
Balsam Lake	NW	147.1950	N9QFW	N9QFW	110.9	O	E WX RACES ARES
Three Lakes	NE	147.1950	N9GHE	N9GHE	114.8	O	RACES ARES
Sturgeon Bay	NE	147.2100	W9AIQ	DC ARC		O	AP CA E X Z 911
Beldenville	NW	147.2250	N0NIC	B.A.T.S.	110.9	O	AP E P
Lodi	SC	147.2250	WB9YXU	WB9YXU	123.0	O	E
Eau Claire	NW	147.2400	W9EAU	E C ARC	110.9	O	DS AP E
Oshkosh	NE	147.2400	KA9JAC	WIN CTY E		O	CA E WX RACES ARES Z
Antigo	NC	147.2550	N9TEV	N9TEV	114.8	O	AP E TT Z
Hayward	NW	147.2550	N9MMU	NVWA	110.9	O	AP E WX L X RACES ARES Z
Sheboygan	NE	147.2550	N9REH	N9REH	127.3	O	DS AP E L
Green Bay	NE	147.2700	KB9ALN	PASS	107.2	O	E WX L Linked to 145.110
Racine	SE	147.2700	KR9RK	LRA Racine		O	E WX ARES TT
Hartford	SE	147.2850	N9LLT	K9MLD	103.5	O	
New Holstein	NE	147.3000	KA9OJN	C.A.R.E.S		O	E WX RACES ARES
Spooner/Hertel	NW	147.3000	KB9OHN	BARS	110.9	O	CA E L Z 911
Ashland	NW	147.3150	W9BCY	NARC		O	CA E WX L ARES TT
Baraboo	SC	147.3150	WB9FLZ	YTARC	123.0	O	E WX X RACES ARES
Port Washington	SE	147.3300	WB9RQR	OZARES	127.3	O	CA E WX X RACES ARES Z 911
Roberts	NW	147.3300	KA9YRV	SCVRA	110.9	O	
Wis Rapids	NC	147.3300	K9PJB	WI AIR RA	114.8	O	
Holcombe	NW	147.3450	N9MMU	N.V.W.A.	136.5	O	E WX L RACES ARES
Oshkosh	NE	147.3450	N9GDY	SOLAR	107.2	O	AP E Z 911*
Cambridge	SC	147.3600	W9CRA	CARA	123.0	O	WX X RACES ARES
Green Bay	NE	147.3600	K9EAM	G B M&K		O	AP E Z
Mount Sterling	SW	147.3600	W9DMH	W9DMH		O	E WX
Chippewa Falls	NW	147.3750	WD9HFT	WD9HFT	110.9	O	DS X
Hales Corners	SE	147.3900	N9CFK	N9CFK	151.4	O	
Waupaca	NC	147.3900	WA9FDC	WARC		O	WX X
Tomahawk	NC	223.7600	N9CLE	TOM RP A	114.8	O	E
Franksville	SE	223.8000	K9DQ	K9DQ	127.3	O	
Eau Claire	NW	223.8200	N9RSU	N9RSU	67.0	O	AP TT Z 911
West Bend	SE	223.8200	KA9UCU	KA9UCU	114.8	O	
Oshkosh	NE	223.9000	W9OSH	W9OSH	107.2	O	
Green Bay	NE	223.9400	K9JQE	K9JQE	107.2	O	DS E
Madison	SC	224.1600	WB9RSQ	WB9RSQ	123.0	O	AP L Z
Germantown	SE	224.1800	W9CQO	O.R.C.		O	E
Beloit	SC	224.3000	N9BUL	C.B.S. RG		O	AP
Fort Atkinson	SC	224.4200	N9DTT	FT AT RG	123.0	O	AP E WX ARES TT Z
Spooner Hertel	NW	224.5000	KB9OHN	BARS		O	AP E L Z 911
Winneconne	NE	224.5000	KB9IE	P.G.R.A.		O	L X TT
West Allis	SE	224.5200	KA9JCP	KA9JCP		O	AP
Manitowoc	NE	224.5400	N9GHE	N9GHE		O	RACES ARES
Wausau	NC	224.6400	W9SM	W.V.R.A.	114.8	O	DS AP E L X ARES Z 911
Portage	SC	224.6600	KE9KX	KE9KX		O	X TT

Kenosha	SE	224.8000	K9RI	K.A.R.S.	127.3	O	AP E WX X RACES ARES Z 911, Wx Ale
Beldenville	NW	224.8400	N0NIC	B.A.T.S.	110.9	O	AP E P
Cudahy	SE	224.9000	NF9G	NF9G		O	AP L X
New Berlin	SE	224.9600	WD9EUF	WD9EUF	127.3	O	
Racine	SE	442.0000	KR9RK	LRA Racine	127.3	O	WX ARES
Ixonia	SE	442.0250	WA9YVF	N9JUU	114.8	O	E RACES ARES
Oshkosh	NE	442.0750	N9GDY	SOLAR	107.2	O	AP E Z 911*
Cedarburg	SE	442.1000	K9QLI	CFD	127.3	O	E
Verona	SC	442.1000	KA9VDU	KA9VDU	123.0	O	
Shell Lake	NW	442.1500	N9PHS	NORWESCO	110.9	O	E WX P RACES ARES
Appleton	NE	442.1750	W9RIC	W9RIC	100.0	O	CA E
Kenosha	SE	442.2000	N9OIG	N9OIG	114.8	O	DS L X
Wausau	NC	442.2000	N9QIP	N9QIP	114.8	O	E L X RACES ARES
Union Grove	SE	442.2500	N9OIG	N9OIG	114.8	O	L X
Chippewa Falls	NW	442.3000	WD9HFT	WD9HFT	110.9	O	DS
Edgerton	SC	442.3000	N9QIP	W.I.N.	123.0	O	E WX L X RACES ARES
Allenton	SE	442.3500	N9GMT	FM38	114.8	O	DS AP E L X Z
Fond du Lac	NE	442.4000	N9QIP	W.I.N.	107.2	O	E L X RACES ARES
Milwaukee	SE	442.4250	N9UUR	N9UUR	127.3	O	E SSTV OK
Milwaukee	SE	442.4750	KF9RU	KF9RU	127.3	O	AP E
Caledonia	SE	442.5000	WE9EE	WE9EE	114.8	O	
Galesville	SW	442.5000	N9QIP	N9QIP	100.0	O	E WX L X RACES ARES TT
Trevor	SE	442.6000	KA9VED	KA9VED	114.8	O	E L
Burlington	SE	442.8500	N9RNA	N9RNA	88.5	O	
Sheboygan	NE	442.9000	AC9A	AC9A	107.2	O	
Cambridge	SE	443.0000	KA9FUR	KA9FUR	123.0	O	L
Milwaukee	SE	443.0250	KB9HIZ	W9DWP	114.8	O	L
River Falls	NW	443.0250	N9QIP	W.I.N.	110.9	O	E L X RACES ARES TT
Milwaukee	SE	443.0500	N9OSK	N9OSK	100.0	O	DS WX
Hubertus	SE	443.1500	K9JAC	K9JAC	127.3	O	CA
Clinton	SC	443.1750	K9RLJ	C.A.T.S.	123.0	O	E RACES ARES
Beldenville	NW	443.2250	N0NIC	B.A.T.S.	110.9	O	AP E P
Plymouth	NE	443.2250	KD9TZ	S CTY 440	107.2	O	E WX
Eau Claire	NW	443.3000	KB9R	KB9R	110.9	O	E
New Berlin	SE	443.3000	W9LR	W9LR	127.3	O	
Mequon	SE	443.3250	N9PMR	N9PMR	127.3	O	
Wausau	NC	443.3250	KA9HQE	KA9HQE	100.0	O	CA
Madison	SC	443.4000	N9KAN	S.W.R.G.	123.0	O	AP CA E L X Z 911
Green Bay	NE	443.5000	KB9AMM	TEARUG	107.2	O	DS CA E L
Spooner/Hertel	NW	443.5000	KB9OHN	BARS		O	AP E L Z 911
Port Washington	SE	443.5250	WB9RQR	OZARES	114.8	O	CA E WX RACES ARES Z 911
Milwaukee	SE	443.5500	N9LKH	N9LKH	127.3	O	E
Black River Falls	NE	443.6000	N9JCX	N9JCX	114.8	O	DS E Part Time, Solar Powered
Appleton	NE	443.6500	W9IEI	F V VHF		O	RACES
Rice Lake	NW	443.6500	W9GDH	ARC2	110.9	O	E
North Freedom	SC	443.6750	KD9UU	S.W.R.G.	114.8	O	WX L X
Green Bay	NE	443.7500	N9TIE	NEWRL		O	L Linked to 146.685
Port Washington	SE	443.7500	W9CQO	O.R.C.	127.3	O	CA E X Z
Wausau	NC	443.7500	KC9NW	KC9NW	71.9	O	CA E WX L X ARES Z
Milwaukee	SE	443.8000	N9GMT	FM38	114.8	O	DS AP E L X Z
Prentice	NC	443.8000	W9ALS	W9ALS	114.8	O	AP E WX L Z 911
Baraboo	SC	443.9000	N9QIP	W.I.N.	100.0	O	E WX L X RACES ARES
Genoa City	SE	443.9250	K9XN	LAKCARS	114.8	O	
Wausau	NC	443.9500	KC9NW	KC9NW	114.8	O	CA E X
Manitowoc	NE	443.9750	N9GHE	N9GHE		O	AP RACES ARES Z
Chippewa Falls	NW	444.0000	WD9HFT	WD9HFT	110.9	O	X
Fitchburg	SC	444.0000	KA9VDU	KA9VDU	123.0	O	X
Sturgeon Bay	NE	444.0000	K9KJM	K9KJM	107.2	O	
Racine	SE	444.0500	KA9LOK	KA9LOK	114.8	O	
Wausau	NC	444.1000	W9SM	W9SM	114.8	O	DS AP E WX L X Z 911
Delafield	SE	444.1250	K9ABC	SEWFARS	114.8	O	CA E Z
Necedah	SC	444.1250	K9UJH	K9UJH	123.0	O	E
North Prarie	SE	444.1500	KA9FUR	KA9FUR	123.0	O	L
Cleveland	NE	444.1750	K9SJ	K9SJ ARES	107.2	O	E WX L RACES ARES
Howard	NE	444.2000	KC9AAJ	KC9AAJ	118.8	O	AP

Osseo	NC	444.2000	N9LIE	N9LIE	110.9	O	L X
Praire Du Sac	SC	444.2500	N9KXX	BSRG	123.0	O	E
Kewaskum	SE	444.2750	N9NLU	N9NLU	127.3	O	E
Wausau	NC	444.3000	KC9NW	R.M.R.A.	114.8	O	CA E X
Milwaukee	SE	444.3250	N9CFG	W.E.R.A.	127.3	O	E
Colfax	NW	444.3500	WA9PAM	WA9PAM	110.9	O	
Plymouth	NE	444.3500	WE9R	WERA	114.8	O	E X
Madison	SC	444.3750	KB9DRZ	KB9DRZ	123.0	O	E L X
Markesan	SC	444.4000	K9WC	G FOX ARC		O	
Kaukauna	NE	444.4500	ND9Z	ND9Z	107.2	O	CA TT
Milwaukee	SE	444.4500	KA9QMD	KA9QMD	114.8	O	AP
La Crosse	SW	444.4750	WR9ARC	RARC		O	AP
Madison	SC	444.5000	WB9TAE	WB9TAE	123.0	O	DS CA E
Germantown	SE	444.5250	WD9IEV	WD9IEV	114.8	O	
Holcombe	NW	444.5250	N9LIE	N9LIE	110.9	O	L X
Hollandale	SC	444.5500	N9QIP	N9QIP/WIN	123.0	O	E WX L X RACES ARES
Tomahawk	NC	444.5750	N9CLE	TOM RPT A		O	
La Crosse	SW	444.6000	N9ETD	MRARA		O	
Sheboygan	NE	444.6000	N9REH	N9REH	114.8	O	DS AP E L
Merton	SE	444.6250	W9JPE	W9JPE	127.3	O	DS E L
Waukesha	SE	444.6500	KA9FUR	KA9FUR	127.3	O	
New Richmond	NW	444.6750	N9LIE	N9LIE	110.9	O	L X
Stevens Point	NC	444.7000	KC9NW	KC9NW		O	CA E L
Big Flats	NC	444.7250	N9WYQ	N9WYQ	114.8	O	E RACES
Milton	SC	444.7500	WB9BJU	WB9BJU	123.0	O	
Park Falls	NC	444.7500	KA9EOK	PRICE CRA		O	E WX RACES ARES
Green Bay	NE	444.7750	K9EAM	G B M&K	107.2	O	CA E X Z
Madison	SC	444.7750	NG9V	NG9V	123.0	O	DS DX Traffic
Spooner	NW	444.8000	W9AEA	W9AEA		O	L
Tomah	SW	444.8000	N9QIP	W.I.N.	110.9	O	E L X RACES ARES
Exeland	NW	444.8500	KD9FC	N9EGE	110.9	O	
Milwaukee	SE	444.8500	W9DHI	WERA	127.3	C	CA E L X
Tomah	SW	444.8500	KB9EBX	KB9EBX	167.9	O	
Milwaukee	SE	444.8750	W9DHI	WERA	127.3	O	E X
Superior	NW	444.9000	WA9KLM	WITC ARC		O	AP E
Waupaca	NC	444.9000	N5IIA	N5IIA	114.8	O	L Linked to 146.670
Hudson	NW	444.9250	N9NGH	N9NGH	110.9	O	E
Milwaukee	SE	444.9250	N9NGI	N9NGI	127.3	O	CA Z
Princeton	SE	444.9500	N9GMT	FM38	100.0	O	E L X
Marshfield	NC	444.9750	KC9AAR	M.A.A.R.S.		O	E ARES
Wausau	NC	918.0000	KC9NW	R.M.R.A.		O	E X
Sturgeon Bay	NE	920.0000	K9KJM	K9KJM		O	
Sturgeon Bay	NE	1282.1000	K9KJM	K9KJM		O	Experimental
Appleton	NE	1282.2000	N9QZD	N9QZD		O	

-- ATV --

Baraboo	SC	421.2500	KB9SFS	B.A.T.S.		O	ATV -- Input 923.25
Baraboo	SC	421.2500	KB9SFS	B.A.T.S.		O	ATV -- Input 1252
Wausau	NC	421.2500	KB9RFT	FMATS		O	E L X RACES ARES Input 915MHz
Wausau	NC	915.0000	KB9RFT	FMATS		O	E L X ARES FM-ATV -- Input 1.25GHz
Wausau	NC	1250.0000	KB9RFT	FMATS		O	E L X ARES FM-ATV -- Input 915 MHz

Mutual Aid

Box Alarm System

MABAS Division HQ's

The Mutual Aid Box Alarm System (MABAS) is an organization of hundreds of fire departments in the Illinois and Southern Wisconsin. MABAS provides an orderly move up of equipment to the scene of fires, accidents or other incidents. Equipment is moved around according to predetermined lists, called "Box Cards" Each card covers specific types of incidents in specific areas. Small towns may have a single Fire box card, larger towns may have dozens. MABAS was recently adopted statewide in Illinois for Fire and EMS Mutual Aid. More divisions are being added monthly and eventually the entire state will be part of MABAS divisions. Neighboring states are also joining, including Missouri, Indiana, Iowa and Kentucky.

MABAS is broken down into "Divisions" Each Division has a Headquarters Dispatch and a Back-up Dispatch. When a department realizes it can not contain an incident alone they contact the local MABAS Division Dispatch and requests a "Box Alarm" Box Alarms have 5 levels, 1 thru 5. The first alarm, usually just called a "Box" typically brings 2 or 3 engines, 1 or 2 trucks, and perhaps some EMS or other specialized equipment. Also, "Chiefs" are assigned. Chiefs (which might actually be Lt.'s, Captains or Deputies) are assigned to various tasks like "Staging", "Rehab", "Safety", or "Sectors". They report to "Command" (who is in overall command of the incident). Command may be in a vehicle with a green flashing light. MABAS has adopted the National Incident Command system to coordinate scenes in an orderly and recognized manner. This allows agencies that may be unfamiliar with each other to work together under a unified command and with common procedures.

When a MABAS Alarm is requested the MABAS Dispatcher will send out Plectron tones of 1082 Hz (1.5 sec.) and 701 Hz (3.5 sec.) on the NIFERN frequency of 154.265 MHz. to set off alert receivers at various fire dispatch centers. These tones are to be used by ALL MABAS Divisions. Dispatch Centers will then listen to the announcement and dispatch their equipment when requested to the scene or to another station on a "Change of Quarters" After the equipment is dispatched and en-route they notify the Division HQ on NIFERN and all further communications are with MABAS. Once a unit is at the scene they report in to Command. Most incidents use a "Staging Area" where responding units will wait until called to a position at the scene.

If the Main Division HQ department can not handle the alarm then the Division Backup will handle it. This occurs sometimes when the dispatch center also handles the department that is stricken, or perhaps has radio difficulties.

154.265 has been designated as the Statewide fire mutual aid channel in late 2001 for Illinois, and will soon be called "IFERN" (Interagency Fire Emergency Radio Network). With this change there has been some changes proposed to the officially recognized nomenclature of frequencies:

Color	Frequency	Name
Red	153.830	Fireground 830
Blue	154.295	Fireground 295
White	154.280	Fireground 280
Green	150.790	Fireground 790
	155.340	MERCI 340 (South)
	155.400	MERCI 400 (North)
	155.280	MERCI 280 (Inter-Hospital)
	155.160	MERCI 160 (Metro-East)
	155.055	IREACH

Whether this plan is officially adopted remains to be seen. These channels may already be in use for other purposes in some areas. Individual agencies radio layouts vary widely and the channel positions do too. Most VHF Fire portables have the main dispatch channel as #1 and the very last position as Fireground (Usually 153.830) so that the firefighter can easily find the channels just by turning the channel selector to the stops.

Power output on any Fireground channel should be limited to 10 watts or less to avoid interference between multiple scenes. All agencies are responsible for making sure they hold current FCC licensees on any frequency they operate on.

PL (CTCSS) is not supported on any of these frequencies for MABAS operations. While some radios may transmit PL they should always listen in non-PL (Carrier squelch) mode. All ambulances in the state of Illinois are supposed to have 155.340 (PL 210.7) installed.

Other frequencies may often be used as Fireground channels. Listen to 150.775 and 150.805 as well as any VHF fire channel. Sometimes local government channels will be used, as well.

The above has been heard in use by some departments already. Green 4 was intended for use as a Landing Zone Coordination channel for helicopters but that recommendation was not passed, and helicopter operations are suggested to use either a MERCI channel or IREACH. Since aircraft communications travel great distances use of IFERN is not recommended.

There will be many changes to MABAS as a result of the Homeland Security initiatives. RED Center (MABAS Division 3) has been designated the State of Illinois Emergency Operations Center for MABAS operations and will coordinate the state?Ĵs Fire/EMS resources in the event of a major event that results in the declaration of a State Disaster.

Some Divisions are more organized than others. Division 3 has a Haz-Mat trailer that is fully equipped to handle most types of materials that are found or transits the area. Other districts have specialized vehicles or equipment that was purchased thru the Division and used by any department in the Division. Some Divisions have adopted unified numbering schemes. For example, all departments in Division 3 share a numbering plan based upon the one used by RED Center. RED Center is the HQ for the Division and dispatches many of the departments in it.

An agency will be a member of a single Division officially. This is to keep statistics as correct as possible and to assure that equipment rosters are only counted once. Any agency may respond into any other division as need be and members of any nearby Division may respond to a call for assistance.

With the recent expansion of MABAS to areas that have not used 154.265 for Mutual Aid some variations may occur. The south suburbs have historically used 154.280 for Mutual Aid, so not all departments may be able to access 154.265 at this time.

MABAS was started in 1968 by the Elk Grove Fire Department who borrowed Chicago FD's existing Box Card system of fire management and created a system for the suburban area. Most Divisions and departments use the "Incident Management System" to manage fires and incidents. Between this and other MABAS protocols followed departments can work together to make sure that all personnel are accounted for and all act as a single team instead of unfocused individuals.

Most of the information contained on these pages was obtained from Dave Hudik, Steve Rauter and the members of CARMA and FireNet-Chicago. Please send any updates or corrections to me at rch@n9jig.com so I can forward it on to them. Also, if you wish to use this information for any purpose other than individual knowledge please ask first. Many hours were spent putting this all together by myself, Dave, Steve and FireNet-Chicago. It is only fair that they get acknowledgment for the work involved. Also, please be aware that this page is not official. While the information herein is believed accurate at the time it was written changes occur and errors creep in. I am not a member of MABAS, nor do I speak for any MABAS member.

CARMA is the Chicago Area Radio Monitoring Association, the largest organization of scanner listeners on the country. We have get-togethers every month, with regular meetings on bimonthly Saturdays and informal "Friday Nighters" on bimonthly Fridays. See our web page for dates and details.

What is FireNet? Glad you asked! FireNet-Chicago provides paging services to fire buffs, media, and others interested in Fire responses via alphanumeric pagers. See their web page at http://www.firenetchicago.net/ for details.

MABAS Division Map.

Click on the Division Number to see the list of departments in that Division. Be advised that many departments respond to more than a single Division but would only be an official member of a single Division.

Div.	Main Dispatch	Back-Up	Area Served	
01	NWCD	RED Center	Northwest Cook and SW Lake Counties	Div 1 Website
02	QuadCom		North Kane, NW DuPage Counties	
03	RED Center (Northbrook)	Des Plaines	North Shore Cook & Lake Counties	Div 3 Website
04	Lake Forest	Mundelein	Lake County	Div 4 Website
05	Crystal Lake Regional	McHenry Shf	McHenry County	Div 5 Website
06	DeKalb Co Shf.	DeKalb City PD	DeKalb County	
07	Kankakee Co. Shf		Kankakee County	
08	Rockford FD	North Park	Winnebago County	Div 8 Website
09	Chicago	None	Chicago	
10	Tri-State FPD	Pleasantview FPD	West Cook County, SE DuPage County.	Div 10 WebSite
11	Oak Park		Near West Cook County	
12	DuComm		DuPage County	
13	Kane Co. Shf	Tri-Com	Kane County	
14	KenCom		Kendall County	
15	Wescom	Will Co Shf	Will County	
16	Naperville 911	Naperville EOC	Southwest DuPage County	Div 16 Website
17	"RED Center" (Freeport FD)		Stephenson County	
18	Ogle Co. Shf	Rochelle 9-1-1	Lee, Ogle Counties	Div 18 Website
19	Orland Central Dispatch	SWCD	SW Cook County, parts of Will Co.	Div 19 Website
20	"Norcom" (Northlake FD)		West Central Cook Co.	Div 20 Website
21	Oak Lawn Central Dispatch	SWCD	SW Cook County	Div 21 Website
22	Blue Island		SW Cook County	
23	LivCom		Livingston County	
24	Orland Dispatch	Tinley Park, Homewood	South Suburbs	
25	LaSalle Co 911		LaSalle County	
26	Douglas County		Douglas Coles, Moultrie and Edgar Counties.	
27	EastCom	Will County	Southeast suburbs	
28	MetCad		Champaign County area	
29	Carroll County		Carroll County IL	
30	Whiteside Co.		Whiteside County IL	
31	Knox County		Knox and Henry Counties IL	
32	CenCom (County 9-1-		St. Clair County	Div 32 Website

	1)			
33	WoodCom		Woodford County	
34			Randolph County	
35			Madison County	
36			Peoria County	
37			Iroquois County	
38			Ogle County	
39			Henry County	
40			Vermilion County	
41	MetCom		McLean County	
42	TazCom		Tazewell County	
101	Kenosha Co Shf	Salem Rescue	Kenosha County WI	
102	Racine Sheriff	Burlington (City) FD	Racine County WI	
103	Walworth Co.		Walworth County WI	
104	Rock County	Town of Beloit	Rock County WI	
	Waukesha Co.		Waukesha Co WI.	
900	?	?	Will County Refineries	
		Indiana	Departments in the NW Indiana Area.	
		Michigan	Departments in the SW Michigan area	

MABAS APPARATUS/EQUIPMENT ABBREVIATIONS:

ACID	CHEMICAL SUITS
AMBL	MICU AMBULANCE
BAGS	AIR BAGS
BOAT	BOAT/DRAG HOOKS
DIVR	SCUBA DIVERS
ENGN	ENGINE CO
ESTR	ELEVATED STREAMS
FILL	SCBA CASCADE SYSTEM
FOAM	AFFF FOAM
FSTR	FOAM STREAMS
GFIR	GRASS FIRE RIG
HOSE	LARGE DIAMETER HOSE
JAWS	EXTRICATION
MSTR	MASTER STREAMS
PROX	PROXIMITY SUITS
SCBA	AIR MASKS
TANK	TANKER 1000+ GAL
TRCK	TRUCK CO

There are also several nonprofit organizations that provide canteen service to the area Fire Departments. These volunteers respond to scenes in specially equipped vehicles with hot and cold drinks, food, gloves and other items to assist emergency personnel during long incidents.

Metropolitan Emergency Support Service (MESS).

Racine Fire Bells

These pages were put together by Rich Carlson, N9JIG, with information from many sources, including MABAS Members, Steve Rauter, Dave Hudik, FireNet and the many members of CARMA.

Back to the Main Radio Page	IL Highways Page	Rich's Photo Gallery
Back to the MABAS Page	E-Mail Corrections & Updates	CARMA
FireNet Paging Service		**11-20-2002**

SEWI Monitoring Page - Railroads

Here are the latest scanner frequencies for area railroads. Frequencies followed by a * have been confirmed by the author in May 1996 or later. Others' confirmations gratefully accepted. Some information on this page is gathered from this great RR frequency reference page. Other info from FCC database or reader submissions.

I must link the Wisconsin Railfan Page, an awesome resource for local RR info.

Local Frequency Usage	Reader Submitted Additions	Railroad Related Data Communications

Local Frequency Usage

- Amtrak

160.305 -- used for onboard low power comms on the Empire Builder
Amtrak runs over the Soo Line / CP in Wisconsin with several Milwaukee/Chicago round trips and one Chicago/Minneapolis Empire Builder per day. Listen for them on CP Road channels.
Empire Builder schedule
Hiawatha schedule

- Canadian Pacific (Soo Line) - Soo is owned by the Canadian Pacific. Most operations are handled under the CP name.

Current CP/Soo frequency usage:
161.370 *- [AAR channel 84] -- channel 1 Road - Hump operation on the south side of the Menomonee River Valley.
161.520 *- [AAR channel 94] -- channel 2 Road - Dispatcher west of Milwaukee depot. Defect detector at MPs 108.2, 132.3, 207.5, 231.3. DTMF tones call dispatcher.
161.085 *- [AAR channel 65] -- channel 3 Road - Misc movements
160.770 *- [AAR channel 44] -- channel 4 Road - Dispatcher east (south) of Milwaukee depot. Defect detector at MP 70.7s, 57.6 (high/wide at Somers). DTMF tones call dispatcher.
161.430 *- [AAR channel 88] -- channel 5 Yard
160.725 *- [AAR channel 41] -- channel 6 Yard - (maintainers)
161.205 -- [AAR channel 73] -- police, mutual aid
160.260 -- [AAR channel 10] -- police, piggyback (Chicago perhaps?)
160.620 -- [AAR channel 34] -- police, piggyback (Chicago perhaps?)

Union Pacific - Formerly C&NW in the Milwaukee area.
160.890 *- [AAR channel 52] -- channel 1 (road) - Adams subdivision dispatcher (NW of Butler). DTMF tones call dispatcher.
160.455 *- [AAR channel 23] -- channel 2 (MOW)
161.040 *- [AAR channel 62] -- channel 3 (road) - Shoreline sub (NE of Butler) and Kenosha sub (SE of St. Francis, Metra) dispatcher. Dragging Equipment detector at MP63.2 Racine.
161.175 *- [AAR channel 71] -- channel 4 (yard)
160.575 -- [AAR channel 31] -- channel 5 (yard)
160.485 *- [AAR channel 25] -- (road) - Milwaukee subdivision (SW of St. Francis) dispatcher. Defect detector. DTMF tones call dispatcher. Also Mitchell Yard (35th & Cleveland Ave.) operations.
161.205 -- [AAR channel 73] -- police
161.475 -- [AAR channel 91] -- Proviso hump

- **Wisconsin & Calumet**

160.215 -- [AAR channel 07] -- road

- Wisconsin & Southern

160.575 *- [AAR channel 31] -- channel 1 (road)
161.145 -- [AAR channel 69] -- channel 2 (MOW, yard)

- Canadian National (Wisconsin Central Division)

160.785 *- [AAR channel 45] -- channel 1 (road west)
160.260 -- [AAR channel 10] -- channel 2 (yard)
161.295 *- [AAR channel 79] -- channel 3 (road east) Defect detector at MP108.8, 120.2, 144.6. MP 229.0 Wrightstown, 287.1 Marshfield
160.335 -- [AAR channel 15] -- channel ? (road)
North Fond Du Lac WC freqs
Unofficial WC page

Reader Submitted Additions

- From John in Milwaukee:

43.04 PL107.2 Hulcher Emergency Railroad Services (nationwide) - derailment cleanup, heavy equipment

- From an RCMA report describing frequency usage at Stevens Point:

160.260: Yardmaster for yarding and departure instructions.
160.845: Main track for "A" yard, roundhouse, and "Iron Track".
161.070: Main track for "B" yard, South yard, and track 101.
161.250: All "Rip" tracks
161.385: The "Vetter" spur and the Plover yard.

- Northern Rail Car Company (Milwaukee)

151.655

- Wisconsin Central North Fond Du Lac Frequencies submitted by C. Mier

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1  160.785 Road(central)
2  160.260 Road(north,shops yard)
3  161.295 Road(east, west)
4  160.335 Road(central, north)
5  160.845 Yard operations
6  161.070 Shops Roundhouse
7  161.250 Yard operations
8  161.385 Yard operations
9  160.965 Yard operations
10 160.575 Yard operations,WSOR Road
11 161.190 Yard operations
12 161.445 yard operations
13 160.680 Repeater(always active)
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Railroad Related Data Communications

- **AEI (Automatic Equipment Identification)** - trackside "panel" antennas which interrogate and read ID tags on rail cars
  - AEI system description
  - FCC Service code LN

911.5 -- CP/UP/WC

913.1 -- CP/UP
915.0 -- CP/UP
917.0 -- CP/UP
918.5 *- CP/UP
921.5 -- CP/UP

- **ATCS (Advanced Train Control System)** - wide area messaging systems containing track signals and other train data
  - licensed to AAR nationwide, not individual railroads, though some AAR listings mention transmitter positions.
  - base sites generally co-located with other railroad transmitters, towers, or tracksides
  - there are no base sites active in the Milwaukee area, but some locomotives do send beacons in search of bases
  - ATCSmon - info from Dave Huoy
  - Some industry info from Nextema
  - Sample sound - about halfway down page

935.8875 -- BCPs (base side)	896.8875 *- MCPs (mobile side)
935.9375 -- BCPs (base side)	896.9375 *- MCPs (mobile side)
935.9875 -- BCPs (base side)	896.9875 *- MCPs (mobile side)
936.8875 -- BCPs (base side)	897.8875 -- MCPs (mobile side)
936.9375 -- BCPs (base side)	897.9375 -- MCPs (mobile side)
936.9875 -- BCPs (base side)	897.9875 -- MCPs (mobile side)

- **ARES Railroad Telemetry**
  - Used by the BNSF railroad in northern IL and much of the US. Data sounds like aviation's ACARS and partly syncs up using ACARS decoders. Indeed the protocol may have ties to the ARINC corp. Thanks to David Huoy for relaying this system. This system might is in use along the Mississippi as well. According to the gov't, the system hasn't been implemented by BNSF, but I'm convinced otherwise!
  - Sample sound - about halfway down page

161.325 all devices - folded dipoles on short masts at each grade crossing, dual dipoles at block signals

- **EOTD/EOT/FRED (End Of Train Device / Flashing Rear End Device)**
  - Sample sound - about halfway down page

457.9375 *- EOT to locomotive
452.9375 *- locomotive to EOT
161.115 *- EOT to locomotive (NS railroad standard)

- **Other RF Codeline** - trackside 900MHz yagis on wooden poles for track signaling
  - FCC Service code MG
  - Sample sound - at beginning of mystery modes area

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952.xxxxx in WI along CP trackage
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Back to SEWI Monitoring Page

144 mhz Repeater Directory

Revised on Dec 8, 2002

Go *HERE* for more information on any items listed in *red italics*.

Output	QD	County	City	Call	Ac	PL	Features	Sponsor	Last TDS
[illegible]	*[illegible]*	*Wayne*	*Detroit*	*[illegible]*	*O*	*100.0*	*[illegible]*	*[illegible]*	*[illegible]*
[illegible]	*SE*	*Kent*	*Grand Rapids*	*K8SG*	*O*			*Kent RACES*	*[illegible]*
145.130	NW	Crawford	Grayling	WD8LUM	O		A e R Wx	ARAHH	10/22/02
145.130	SW	Ionia	Portland	N8ZMT	O	94.8	A ds e R Wx	Ionia ARES	11/29/01
145.130	SE	Oakland	Troy	K8NA	O	100.0		SEMDXA.	12/18/01
145.150	SW	Calhoun	Battle Creek	W8HVG	O	94.8	a e L Wx x z	IRA	02/23/01
145.150	NW	Isabella	Mt Pleasant	W8HVG	O	103.5	a e L Wx x z	IRA	02/23/01
145.150	NW	Grand Traverse	Traverse City	W8HVG	O	114.8	a e L Wx x z	IRA	02/23/01
145.170	SW	Kalamazoo	Kalamazoo	N8DXB	O	94.8	A e	N8DXB	11/25/02
145.170	SE	Wayne	Northville	K8RUR	O	100.0	a A L p R Wx z	I 94 ARC	08/07/01
145.170	NE	Ogemaw	Rose City	K5EKP	O	141.3	(ca) A e R Wx	K5EKP RS	05/21/02
145.190	NE	Montmorency	Lewiston	N8SCY	O	123.0	L	RARG	03/06/02
145.190	SE	Genesee	Rankin	W8YUC	O	100.0	(ca) ds e L Wx x	RARG	07/16/01
145.210	SW	Cass	Dowagiac	KU8Y	O	131.8	e Wx	KU8Y	10/29/01
145.210	NW	Missaukee	Lake City	KG8QY	O		(ca) e z	Rat Pack	02/23/01
145.230	SE	Washtenaw	Ann Arbor	W8UM	O	100.0	e	U of M ARC	07/18/01
145.250	NE	Oscoda	Luzerne	K8GER	O		a e Wx	K8GER	05/09/02
145.250	SE	Oakland	Pontiac	W8OAK	O	100.0	a e R Wx	Oakland Co EmerMgmt	02/23/01
145.270	SE	Wayne	Dearborn	K8UTT	O	100.0	a	Ford ARL	03/11/02
145.270	SW	Kent	Lowell	W8LRC	O	94.8	a A e Wx x z	LARC	11/07/02
145.270	NW	Grand Traverse	Traverse City	W8TVC	O	114.8	e L	W8TVC	04/15/02
145.290	NW	Newaygo	Big Rapids	W8HVG	O	94.8	a e L Wx x z	IRA	02/23/01
145.290	SE	Shiawassee	Durand	N8IES	O	100.0	A L R Wx	N8IES	02/17/02
145.290	NW	Missaukee	Vanderbilt	W8HVG	O	103.5	a e L Wx x z	IRA	02/23/01
145.310	NE	Bay	Bay City	N8BBR	O	131.8	a A e L R Wx	BARC	08/08/01
145.310	SW	St Joseph	Centerville	WB8ZEQ	O	94.8	(ca) A e R Wx	ARPSA	12/05/02
145.310	NW	Mason	Ludington	W8HVG	O		a e L Wx x z	IRA	02/23/01
145.310	SE	Monroe	Monroe	W8YZ	O		A e L R Wx	MEMRA	08/25/02
145.330	SE	Wayne	Detroit	WR8DAR	O	100.0	A R Wx	RADAR	07/16/01
145.330	NE	Saginaw	Hemlock	K8DO	O	88.5		K8DO	05/11/01
145.330	SW	Muskegon	Muskegon	W8HVG	O	94.8	a e L Wx x z	IRA	02/23/01
145.350	SE	Wayne	Livonia	K8UNS	O	100.0	(ca)	LARC	12/06/02
145.350	SW	Calhoun	Marshall	K8UCQ	O			ECCRA	08/30/02
145.350	NE	Oscoda	Mio	WT8G	O		e	AVARC	04/09/02
145.370	SE	Lenawee	Adrian	W8TQE	O	85.4	a A e Wx	Adrian ARC	11/26/01
145.370	SW	Gratiot	Alma	KC8MUV	O		A e z	Alma RC	11/18/02
145.390	NW	Leelanau	Leland	W8TCM	O		(ca) e R z	LRA&CARC	12/21/01
145.390	SW	Ingham	Okemos	WB8CQM	O	100.0	A e R Wx x	LCDRA	12/05/01
145.410	SW	Kent	Grand Rapids	WD8EMD	O	94.8	(ca) A e R Wx z	541 Inc	08/19/02
145.410	NE	Ogemaw	West Branch	W8YUC	C			RARG	07/16/01
[illegible]	*NE*	*Oscoda*	*[illegible]*	*[illegible]*	*O*	*94.8*		*NW8J*	*[illegible]*
145.430	*SE*	*Oakland*	*Waterford*	*W8JIM*	*C*		*[illegible] p Wx z*	*W8JIM*	*[illegible]*
145.450	SE	Washtenaw	Chelsea	NT8F	O		a A e R Wx z	CARC	03/02/01
							A e R Wx		

145.450	NE	Roscommon	Roscommon	WF8R	O		z	C/RARA	07/31/02
145.450	NW	Newaygo	White Cloud	KB8IFE	O	94.8	(ca) e	KB8IFE	01/03/02
145.470	NE	Huron	Bad Axe	N8LFR	C			LHARC	08/20/01
145.470	SW	Jackson	Jackson	KA8HDY	O	100.0	(ca) e L z	KA8HDY	01/09/02
145.470	NW	Mason	Ludington	K8DXF	O		A e Wx z	K8DXF	05/05/02
145.470	SW	Berrien	St Joseph	W8HVG	O	94.8	a e L Wx x z	IRA	02/23/01
145.490	NE	Alpena	Alpena	N8BIT	O	100.0	a A e L R Wx	8BITRG	10/22/01
145.490	SW	Ottawa	Grand Haven	W8CSO	O	94.8	a A e L Wx z	NOARC	08/19/01
145.490	SE	Oakland	White Lake Twp	N8BIT	O	67.0	a e L z	8BITRG	09/06/01
146.400	SE	Oakland	Royal Oak	KA8ZRR	O	100.0	L	KA8ZRR	02/21/02
146.500	SW	Barry	Hastings	KB8SEM	O		e p Wx	KB8SEM	05/14/02
146.500	NW	Roscommon	Higgins Lake	N8QOP	O	100.0	L	N8QOP	[illegible]
146.500	SW	Ottawa	Holland	K8DAA	O	94.8	A R Wx	HARC	02/24/01
146.500	SW	Van Buren	Mattawan	N8ZFU	O	127.3	e Wx	N8ZFU	08/20/01
146.500	SW	Barry	Nashville	W8BMZ	O	110.9	a A e L R Wx z	W8BMZ	09/22/02
146.500	NE	Saginaw	Saginaw	KC8CHR	C			MMWA	09/[illegible]
146.500	SW	Muskegon	Whitehall	W8WPD	C		A e p R Wx	W-M ES	01/28/02
146.620	SE	Lapeer	Lapeer	W8LAP	O		a A e R Wx z	LCARA	08/11/01
146.620	NW	Mason	Ludington	WB8ERN	O		a e	WB8ERN	08/10/01
146.640	NW	Oceana	Hart	N8UKH	O	94.8	a A e R Wx z	OCARES	11/22/02
146.640	SE	Oakland	Oak Park	W8HP	C		a Wx	DART	02/27/02
146.640	NE	Iosco	Tawas	W8ICC	O	103.5	A R Wx	I CARE	07/23/02
146.660	SW	Calhoun	Battle Creek	W8DF	O	94.8	a A e p R Wx z	SMARS	04/20/02
146.680	NE	Tuscola	Caro	W8NBJ	O		A e R Wx	TCARA	09/14/00
146.680	SE	Livingston	Howell	KA8BOG	O	100.0	(ca) A e R z	LARK	03/05/01
146.680	NW	Emmet	Stutsmanville	W8GQN	O	110.9	a e Wx x z	SAARC	08/21/01
146.680	SW	Muskegon	Whitehall	K8COP	O	94.8	A R	K8COP	[illegible]
146.700	SW	Ingham	Lansing	WB8CQM	O	100.0	a A e R x z	LCDRA	12/04/01
146.700	NE	Oscoda	Mio	K5YHA	C		(ca) A R Wx	K5EKP RS	05/21/02
146.720	SE	Monroe	Monroe	WA8EFK	O		(ca) A e L R Wx z	RRRA	12/27/01
146.720	NE	Midland	Pleasant Valley	KB8ZGU	O		A e R Wx x z	CMARA	11/20/02
146.720	SE	St Clair	Port Huron	N8CQA	O	100.0	A	PHART	12/21/01
146.720	SW	Berrien	St Joseph	KE3K	O	131.8	(ca) A e R Wx z	SCRA/BARA	11/25/01
146.740	NW	Mecosta	Big Rapids	KB8QOI	O		a A Wx	BRAARC	11/15/02
146.740	NE	Cheboygan	Cheboygan	W8IPQ	O	103.5	e	CCARA	[illegible]
146.740	SE	Wayne	Detroit	K8BYI	O	100.0	(ca) A ds e R Wx	SEMARA	01/18/02
146.760	NE	Alpena	Alpena	[illegible]	O	88.5	a A e Wx z	TBARC	07/06/99
146.760	SE	Wayne	Detroit	[illegible]	O	100.0	a A ds e R x z	[illegible]	08/28/00
146.760	SW	Kent	Grand Rapids	W8DC	O			GRARA	[illegible]
146.780	SE	Genesee	Fenton	[illegible]	O		a e z	FLARA	02/02/00
146.780	NW	Manistee	Manistee	AB8CY	O		e	WMRA	10/17/02
146.800	NW	Montcalm	Edmore	WB8VWK	O		A e Wx x	CMARA	01/24/01
146.800	SE	St Clair	Port Huron	[illegible]	O	100.0	[illegible]	[illegible]	04/04/00
146.820	NE	Tuscola	Caro	WA8CKT	O		a A e Wx z	WA8CKT	08/13/01
146.820	NW	Otsego	Gaylord	N8JTQ	O		(ca) A e Wx z	TOMARC	09/12/02
146.820	SW	Muskegon	Muskegon	K8WNJ	O	94.8	a A e R	MCARESG	09/14/01
146.820	SW	Berrien	Sister Lakes	W8MAI	C		A e R Wx x	BARA	10/16/01
146.820	SE	Oakland	Southfield	[illegible]	O			[illegible]	[illegible]
146.840	SE	Oakland	Clarkston	K8NWD	O	100.0	(ca) A e R Wx	CRA	08/21/01
146.840	SW	[illegible]	Plainwell	[illegible]	O		e	[illegible]	[illegible]
146.860	SE	Wayne	Garden City	[illegible]	O	100.0	[illegible]	GCRA	[illegible]
146.860	NE	Sanilac	Sandusky	W8AX	O		A e Wx	Thumb ARC	12/31/01

147.240	SE	Wayne	Wyandotte	K8SB	O		e	DARES	02/21/01
147.260	SE	Genesee	Flint	KC8KGZ	O	100.0	(ca) A e R Wx z	GCARES	01/27/02
[illegible]	SW	Kent	[illegible]	[illegible]	O	94.8	[illegible]	[illegible]	[illegible]
147.280	NW	Charlevoix	East Jordan	W8COL	O	103.5	(ca) e R Wx x z	COLARC	10/21/01
147.300	SW	Branch	Coldwater	WD8KAF	O	100.0	A e Wx	BCARC	11/07/02
147.300	SE	St Clair	Port Huron	K8DD	O		A e R Wx x	PHART	03/25/01
[illegible]	NW	[illegible]	[illegible]	[illegible]	O			[illegible]	[illegible]
147.320	NW	Muskegon	Holton	WD8MKG	O	94.8	(ca) A e L p R Wx x z	WD8MKG	11/20/02
147.320	NE	Tuscola	Watrousville	N8UT	O	110.9	A ds e R Wx x	AREA	05/11/01
147.340	SE	Genesee	Flint	W8ACW	O	100.0		GCRC	11/15/02
147.360	SW	Van Buren	Bangor	WA8PRJ	O	94.8	A e R Wx	BRARC	03/12/01
147.360	NE	Bay	Bay City	N8BBR	O		(ca) A e L R Wx	BARC	08/08/01
147.360	SW	Jackson	Jackson	KA8HDY	O	100.0	a A e R	CARS	01/09/02
[illegible]	SE	Genesee	Burton	[illegible]	O		[illegible]	[illegible]	[illegible]
147.380	SW	Muskegon	Fruitport	KE8LZ	O	94.8	A z	KE8LZ	11/24/02
147.380	NW	Antrim	Mancelona	K8WQK	O		e	CARC	12/21/01

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146.860	NW	Leelanau	Traverse City	W8SGR	O		(ca) e R x z	CARC	12/21/01
146.860	SW	Clinton	Wacousta	N8DEF	O	100.0	A e L R Wx	WIRE	07/25/01
146.880	NE	Huron	Bad Axe	KA8PZP	O		e	Thumb ARC	06/05/01
[illegible]	[illegible]	Kent	[illegible] Springs	NWSJ	O	141.3	[illegible]	NWSJ	[illegible]
[illegible]	[illegible]	Jackson	Jackson	[illegible]	O	[illegible]	[illegible]	[illegible]	[illegible]
146.900	SE	Oakland	Milford	NW8R	O		a A e R Wx z	NW8R	08/08/01
146.900	NE	Iosco	Oscoda	KB8RWG	O		[illegible]	Alcona CRA	07/31/00
[illegible]	[illegible]	Newaygo	Fremont	[illegible]	O		[illegible]	[illegible]	[illegible]
146.920	NW	Leelanau	Lake Leelanau	N8JKV	O	114.8		N8JKV	04/07/02
146.920	SE	Washtenaw	Ypsilanti	K8RUR	O	100.0	a A L p R Wx z	I 94 ARC	08/07/01
146.940	SW	Ingham	Lansing	WB8CQM	O	100.0	A e R x	LCDRA	12/04/01
146.940	SW	Muskegon	Muskegon	W8ZHO	O	94.8	a	MAARC	09/14/01
146.940	NE	Ogemaw	West Branch	WB8UJB	O	110.9	A e R Wx	OARS/K5EKP	08/20/02
146.960	SE	Washtenaw	Ann Arbor	K8PBA	O		(ca) x	Arrow RC	06/14/01
146.960	NW	Missaukee	Moorestown	KA8ABM	O		(ca) e	KA8ABM	05/10/02
146.980	NW	Osceola	Cadillac	K8CAD	O		(ca) e Wx x	WEXARC	10/07/01
146.980	SE	Washtenaw	Chelsea	NT8F	O		a A e R Wx z	CARC	03/02/01
147.000	SW	Kalamazoo	Kalamazoo	W8VY	O	94.8	(ca) e L R	KARC	11/07/01
147.000	NE	Midland	Midland	W8KEA	O	103.5	a A e R Wx z	MARC	03/07/02
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	O		[illegible]	[illegible]	[illegible]
147.020	NE	Presque Isle	Rogers City	WB8TQZ	O		a e	PICARC	04/03/01
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	O		[illegible]	BenzARC	06/08/99
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	O	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Oakland	[illegible]	[illegible]	O		[illegible]	[illegible]	[illegible]
147.060	SW	Hillsdale	Hillsdale	WD8JOO	O			HARC	08/22/01

147.060	SW	Ottawa	Holland	K8DAA	O	94.8	a A e L R Wx z	HARC	02/24/01
147.080	SW	Eaton	Charlotte	WB8OUT	O	103.5	A R Wx z	ECARC	01/15/02
147.080	NE	Roscommon	Houghton Lake	K5EKP	C		(ca) A e R Wx	K5EKP RS	05/21/02
147.080	SE	Macomb	Sterling Heights	N8LC	O		e	LCARC	08/14/02
147.100	SE	Genesee	Flint	KC8KGZ	O	100.0	(ca) A ds e R Wx z	GCARES	01/27/02
147.100	NW	Grand Traverse	Traverse City	[illegible]	O		e R	Cherryland ARC	12/01/00
147.120	NE	Otsego	Gaylord	N8JCN	O	151.4	e	N8JCN	04/07/02
147.120	SW	Calhoun	Marshall	K8ZRL	O	186.2	[illegible] Wx x z	BCE	09/10/99
147.140	NE	Ogemaw	Lupton	K5EKP	O	141.3	(ca) A e L R Wx	K5EKP RS	05/21/02
147.140	SE	Oakland	Royal Oak Twp	N8KD	O		A e L Wx x	SMART	06/08/99
147.160	NW	Missaukee	Cadillac	W8HVG	O		a e L Wx x z	IRA	02/23/01
147.160	SE	Wayne	Dearborn	N8DJP	O	100.0	(ca) A e R	N8DJP	07/16/01
147.160	SW	Kent	Grand Rapids	W8HVG	O		a e L Wx x z	IRA	02/23/01
147.180	NW	Gladwin	Gladwin	WT8J	O	173.8	e	GAARC	10/29/01
147.180	SW	Berrien	Niles	WA8ZPD	C		(ca) A e R	4FlagsARC	11/09/01
147.180	SE	Macomb	Utica	K8UO	O	100.0	(ca) ds	USECA	05/31/02
147.200	NW	Clare	Farwell	WD8MQR	O	146.2	e Wx z	WD8MQR	01/23/02
147.200	SE	Macomb	Mt Clemens	WA8MAC	O	100.0	a A e R Wx	MCEM	02/21/02
[illegible]	SW	Van Buren	Paw Paw	KB8CRR	O	[illegible]	e	[illegible]	[illegible]
147.220	NE	Iosco	Hale	K5YHA	O	141.3	(ca) A R Wx	K5EKP RS	05/21/02
147.220	NW	Oceana	New Era	AB8AZ	C		A el p pkt R Wx	AB8AZ	11/30/02
147.220	SE	Macomb	Roseville	N8EDV	O		L	N8EDV	08/19/01
[illegible]	[illegible]	Allegan	Allegan	[illegible]	O	[illegible]	[illegible]	[illegible]	[illegible]
147.240	NE	Saginaw	Saginaw	K8DAC	O	103.5	a A L R Wx	SVARA	04/02/02

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Output	QD	County	City	Call	Ac	PL	Features	Sponsor	Last TDS
[illegible]	*[illegible]*	*Washtenaw*	*Chelsea*	*[illegible]*	*O*		*[illegible]*	*CARC*	*10/05/99*
224.040	SE	Monroe	Petersburg	KC8HIG	O		(ca) A	HamalotARC	08/08/01
224.080	NE	Alpena	Alpena	N8BIT	O	100.0	a A e L R z	8BITRG	10/22/01
224.080	SE	Oakland	Clarkston	N8BIT	O	67.0	(ca) e	8BITRG	09/06/01
224.120	NW	Manistee	Manistee	KB8BIT	O	100.0	A e L Wx z	KB8BIT	08/30/02
[illegible]	*[illegible]*	*Wayne*	*Westland*	*[illegible]*	*O*	*[illegible]*	*[illegible]*	*[illegible]*	*[illegible]*
[illegible]	*[illegible]*	*Kent*	*Cedar Springs*	*[illegible]*	*O*	*[illegible]*	*[illegible]*	*[illegible]*	*[illegible]*
224.160	SE	Washtenaw	Chelsea	WD8IEL	O		a A e R Wx z	CARC	03/02/01
224.180	SE	Genesee	Flint	KF8UI	O	88.5	(ca) A ds e L R Wx z	KF8UI	01/27/02
[illegible]	*[illegible]*	*Oakland*	*Berkley*	*[illegible]*	*O*		*[illegible]*	*[illegible]*	*08/18/00*
224.220	NE	Ogemaw	West Branch	W8YUC	C		L	RARG	01/11/02
224.240	SW	Calhoun	Battle Creek	W8DF	O		Wx	SMARS	04/20/02
[illegible]	*[illegible]*	*Jackson*	*Hanover*	*N8RLA*	*O*	*[illegible]*	*(ca) e L*	*[illegible]*	*[illegible]*
224.280	NE	Saginaw	Saginaw	K8DAC	O		a A R Wx	SVARA	04/02/02
224.300	SE	Genesee	Mt Morris Twp	KB0ONB	O	88.5	A R	KB0ONB	01/27/02
224.340	SE	Washtenaw	Ann Arbor	W8UHW	O			W8UHW	07/16/01
224.380	SE	Washtenaw	Ann Arbor	W8PGW	O		x	Arrow RC	06/14/01
[illegible]	*[illegible]*	*Montmorency*	*[illegible]*	*[illegible]*	*O*			*[illegible]*	*[illegible]*
[illegible]	*[illegible]*	*[illegible]*	*[illegible]*	*[illegible]*	*O*	*[illegible]*	*[illegible]*	*[illegible]*	*[illegible]*
224.440	SW	Kent	Grand Rapids	WB8VOJ	O			IRA	12/01/02
224.460	SE	Macomb	Roseville	N8EDV	O		L	N8EDV	08/19/01
224.520	SE	Wayne	Dearborn	K8UTT	O	100.0	a	Ford ARL	03/11/02
224.540	SE	Genesee	Flint	KC8KGZ	O	88.5	(ca) A e R Wx z	N8IES/GCARES	01/27/02
224.540	*[illegible]*	*Van Buren*	*Paw Paw*	*[illegible]*	*O*			*[illegible]*	*11/05/94*
224.560	SE	Oakland	Pontiac	WD8INW	O		ds e	WD8INW	11/25/01
224.580	SE	Wayne	Inkster	N8WB	O	100.0	A e L R Wx z	N8WB	05/26/01
[illegible]	*SW*	*Eaton*	*Vermontville*	*[illegible]*	*O*		*[illegible]*	*[illegible]*	*[illegible]*
224.620	SE	Oakland	Milford	N8LBJ	O		a e	N8LBJ	09/09/01
[illegible]	*SW*	*Kent*	*Grand Rapids*	*[illegible]*	*O*		*[illegible]*	*[illegible]*	*[illegible]*
224.680	SE	Wayne	Westland	W8ICN	O	186.2	L	RADAR	07/16/01
224.700	SW	Muskegon	Muskegon	N8KQQ	O	94.8	a e L	N8KQQ	06/05/01
[illegible]	*[illegible]*	*Genesee*	*Burton*	*W8JDE*	*O*		*a e L*	*[illegible]*	*09/10/97*
224.740	SE	Wayne	Canton	W8PMN	O	100.0	(ca)	W8KFN	08/10/01
224.740	SW	Van Buren	Gobles	N8OKU	O	94.8	e Wx	N8OKU	01/18/02
224.760	SE	Lapeer	Almont	WN8VOT	O			WN8VOT	08/10/01
224.760	SW	Kent	Grand Rapids	WD8KXA	O		A e	WD8KXA	11/18/02
224.780	SE	Washtenaw	Ann Arbor	WA8EFK	O		A e L R Wx	RRRA	12/27/01
[illegible]	*[illegible]*	*Wayne*	*Garden City*	*KK8GC*	*O*	*[illegible]*	*(ca) e L*	*GCRA*	*[illegible]*
[illegible]	*SW*	*Cass*	*[illegible]*	*KB6WJ*	*O*			*KA8LGP*	*11/05/94*
224.840	SE	Oakland	Royal Oak	KA8ZRR	O	100.0	(ca) e L	KA8ZRR	02/21/02
224.860	SE	Shiawassee	Durand	N8IES	O	100.0	A L R Wx	N8IES	02/17/02
224.880	*SW*	*Kent*	*Grand Rapids*	*[illegible]*	*O*		*[illegible]*	*[illegible]*	*[illegible]*
224.880	SE	Lapeer	Lapeer	W8LAP	O		A e R Wx	LCARA	08/11/01
[illegible]	*SW*	*Jackson*	*Hanover*	*[illegible]*	*O*	*[illegible]*	*[illegible]*	*[illegible]*	*07/13/98*
224.940	SE	Oakland	Northville	W8NJH	O	100.0	A e L Wx	StuRock	11/20/02
224.960	SE	Genesee	Rankin	W8YUC	C		(ca) e L Wx	RARG	07/16/01
224.980	SW	Ingham	Lansing	WB8CQM	O	100.0	A e R	LCDRA	12/04/01

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Output	QD	County	City	Call	Ac	PL	Features	Sponsor	Last TDS
51.680	NE	Isabella	Mt. Pleasant	N8UXR	O		A e R Wx x	N8UXR	04/29/02
51.700	SW	Ingham	Mason	WB8RJY	C			WB8RJY	01/27/02
[illegible]	*[illegible]*	*Kalamazoo*	*Kalamazoo*	*[illegible]*	*O*			*SWMART*	*03/31/00*
51.740	*[illegible]*	*Macomb*	*Romeo*	*N8MCD*	*O*	*100.0*		*N8MCD*	*[illegible]*
51.760	SE	Genesee	Burton	N8DI	C		(ca) e x	N8DI	01/27/02
51.860	NE	Saginaw	Saginaw	K8DAC	O		a A R Wx	SVARA	04/02/02
[illegible]	*[illegible]*	*Genesee*	*[illegible]*	*[illegible]*	*[illegible]*		*a e L*	*FAIR*	*[illegible]*
51.880	SE	Oakland	Milford	N8LBJ	O		A e	N8LBJ	09/09/01
51.900	*SE*	*Jackson*	*Norvell*	*[illegible]*	*O*	*103.5*		*[illegible]*	*12/06/98*
[illegible]	*SE*	*Macomb*	*East China*	*N8STT*	*O*			*N8STT*	*06/03/99*
51.980	NW	Antrim	Mancelona	K8WQK	O		e	Cherryland ARC	12/21/01
52.280	SE	Monroe	Petersburg	KC8HIG	O		(ca) A	HamaLotARC	08/08/01
[illegible]	*SW*	*Jackson*	*Hanover*	*N8PLA*	*O*	*123.0*	*(ca) e L p Wx z*	*[illegible]*	*[illegible]*
52.640	SE	Oakland	Novi	K8RUR	O	100.0	L	I 94 ARC	08/07/01
52.640	NE	Roscommon	Roscommon	WF8R	O		L	WF8R	07/31/02
[illegible]	*[illegible]*	*Oakland*	*West Bloomfield*	*[illegible]*	*O*		*[illegible]*	*[illegible]*	*[illegible]*
[illegible]	*[illegible]*	*Kent*	*Cedar Springs*	*[illegible]*	*O*	*136.5*	*e*	*[illegible]*	*[illegible]*
[illegible]	*SW*	*Kent*	*Grand Rapids*	*[illegible]*	*O*		*[illegible]*	*GRARA*	*[illegible]*
52.800	SW	Muskegon	Whitehall	K8COP	C		(ca) A e R z	K8COP	01/28/02
52.820	SE	Wayne	Detroit	WA6HBT	O	107.2	a	CATVS	08/09/01
[illegible]	*SW*	*[illegible]*	*[illegible]*	*[illegible]*	*[illegible]*	*[illegible]*	*[illegible]*	*[illegible]*	*[illegible]*
[illegible]	*[illegible]*	*[illegible]*	*[illegible]*	*[illegible]*	*[illegible]*		*L*	*[illegible]*	*[illegible]*
52.980	*SW*	*Calhoun*	*Battle Creek*	*[illegible]*	*O*		*[illegible]*	*[illegible]*	*[illegible]*
53.940	SE	Oakland	Lake Angelus	NE9Y	O	131.8	e	NE9Y	07/28/02

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Michigan Area Repeater Council

SW Quadrant Repeater Directory

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Go *HERE* for more information on any items listed in *red italics*.

QD	County	City	Output	Call	Ac	PL	Features	Sponsor	Last TDS
SW	[illegible]	[illegible]	[illegible]	[illegible]	O	94.8	[illegible]	[illegible]	[illegible]
SW	Barry	Hastings	146.500	KB8SEM	O		e p Wx	KB8SEM	05/14/02
SW	Barry	Hastings	444.225	KB8SEM	O	167.9		KB8SEM	[illegible]
SW	Barry	Nashville	146.500	W8BMZ	O	110.9	a A e L R Wx z	W8BMZ	09/22/02
SW	Barry	[illegible]	[illegible]	[illegible]	O		e	[illegible]	[illegible]
SW	Berrien	Berrien Springs	442.775	W8MAI	O	88.5	A e L R Wx	BARA	10/16/01
SW	Berrien	Berrien Springs	444.025	KE4PM	O		e	KE4PM	08/07/01
SW	Berrien	Niles	147.180	WA8ZPD	C		(ca) A e R	4FlagsARC	11/09/01
SW	Berrien	Sister Lakes	146.820	W8MAI	C		A e R Wx x	BARA	10/16/01
SW	Berrien	Sister Lakes	[illegible]	[illegible]	O		[illegible]	[illegible]	[illegible]
SW	Berrien	St Joseph	145.470	W8HVG	O	94.8	a e L Wx x z	IRA	02/23/01
SW	Berrien	St Joseph	146.720	KE3K	O	131.8	(ca) A e R Wx z	SCRA/BARA	11/25/01
SW	Branch	Coldwater	147.300	WD8KAF	O	100.0	A e Wx	BCARC	11/07/02
SW	Branch	Coldwater	443.300	WD8KAF	O	123.0	A e Wx	BCARC	08/07/01
SW	Calhoun	Battle Creek	52.980	WD8BVL	O		a	SMART	[illegible]
SW	Calhoun	Battle Creek	145.150	W8HVG	O	94.8	a e L Wx x z	IRA	02/23/01
SW	Calhoun	Battle Creek	146.660	W8DF	O	94.8	a A e p R Wx z	SMARS	04/20/02
SW	Calhoun	Battle Creek	224.240	W8DF	O		Wx	SMARS	04/20/02
SW	Calhoun	Battle Creek	443.950	W8DF	O	94.8	Wx	SMARS	04/20/02
SW	Calhoun	Marshall	145.350	K8UCQ	O			ECCRA	08/30/02
SW	Calhoun	Marshall	[illegible]	[illegible]	O	[illegible]	[illegible]	[illegible]	[illegible]
SW	Cass	Cassopolis	[illegible]	[illegible]	O		[illegible]	[illegible]	[illegible]
SW	Cass	Dowagiac	145.210	KU8Y	O	131.8	e Wx	KU8Y	10/29/01
SW	Cass	Glenwood	224.840	KB6WJ	O			KA8LGP	11/05/94
SW	Clinton	Eagle	442.725	KB8SXK	O	100.0	(ca) L	KB8SXK	11/18/01
SW	Clinton	St Johns	444.850	WA8RZJ	O	141.3	e L R Wx	CCARA	08/10/01
SW	Clinton	Wacousta	146.860	N8DEF	O	100.0	A e L R Wx	WIRE	07/25/01
SW	Clinton	Wacousta	444.125	[illegible]	O	100.0	[illegible] R Wx	WIRE	[illegible]
SW	Eaton	Charlotte	147.080	WB8OUT	O	103.5	A R Wx z	ECARC	01/15/02
SW	Eaton	Charlotte	443.625	N8HEE	O	100.0	a A e L R Wx	EFFECT	02/18/02
SW	Eaton	Dimondale	442.050	N9UV	O	100.0	A e z	N9CVU	07/16/02
SW	Eaton	Grand Ledge	[illegible]	[illegible]	O		[illegible]	[illegible]	[illegible]
SW	Eaton	Vermontville	224.600	KB8TT	O		[illegible]	RRRG	[illegible]
SW	Gratiot	Alma	145.370	KC8MUV	O		A e z	Alma RC	11/18/02
SW	Hillsdale	Hillsdale	147.060	WD8JOO	O			HARC	08/22/01
SW	Ingham	Holt	444.925	KE8DR	O		a e L	Delhi UHF	11/24/01
SW	Ingham	Lansing	52.960	KD8PA	O		L	KD8PA	07/22/99
SW	Ingham	Lansing	146.700	WB8CQM	O	100.0	a A e R x z	LCDRA	12/04/01
SW	Ingham	Lansing	146.940	WB8CQM	O	100.0	A e R x	LCDRA	12/04/01
SW	Ingham	Lansing	224.980	WB8CQM	O	100.0	A e R	LCDRA	12/04/01
SW	Ingham	Lansing	442.025	W8LCC	O		e	N8JI	10/12/02
SW	Ingham	Lansing	[illegible]	[illegible]	O		[illegible]	[illegible]	[illegible]
SW	Ingham	Lansing	444.750	N8KRF	O	100.0	a e	N8KRF	09/01/01
SW	Ingham	Mason	51.700	WB8RJY	C			WB8RJY	01/27/02
SW	Ingham	Mason	443.700	WB8RJY	O		(ca) e L	WB8RJY	01/27/02
SW	Ingham	Okemos	145.390	WB8CQM	O	100.0	A e R Wx x	LCDRA	12/05/01
SW	Ionia	Portland	145.130	N8ZMT	O	94.8	A ds e R Wx	Ionia ARES	11/29/01
SW	Ionia	Saranac	443.850	N8TSJ	O		e	N8TSJ	03/01/01
SW	Jackson	Hanover	52.620	N8RLA	O	123.0	(ca) e L p Wx z	N8RLA	07/07/99
SW	Jackson	Hanover	[illegible]	N8RLA	O	123.0	[illegible]	N8RLA	[illegible]
SW	Jackson	Hanover	[illegible]	[illegible]	O	123.0	[illegible]	K8WQB	[illegible]
SW	Jackson	Hanover	444.175	K8WQB	O	123.0	[illegible]	[illegible]	[illegible]
SW	Jackson	Jackson	145.470	KA8HDY	O	100.0	(ca) e L z	KA8HDY	01/09/02

SW	Jackson	Jackson	146.880	W8JXN	O	100.0	a A p R Wx x z	CARS	06/24/[illegible]
SW	Jackson	Jackson	147.360	KA8HDY	O	100.0	a A e R	CARS	01/09/02
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
SW	[illegible]	Kalamazoo	51.720	K8KZO	O			SWMART	03/31/00
SW	Kalamazoo	Kalamazoo	145.170	N8DXB	O	94.8	A e	N8DXB	11/25/02
SW	Kalamazoo	Kalamazoo	147.000	W8VY	O	94.8	(ca) e L R	KARC	11/07/01
SW	[illegible]	[illegible]	[illegible]	K8KZO	O	94.8	[illegible]	SWMART	03/31/00
SW	Kalamazoo	Kalamazoo	444.650	W8VY	O	131.8	e	KARC	11/07/01
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		e L	N8IYX	[illegible]
[illegible]	[illegible]	Cedar Springs	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Kent	Cedar Springs	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Grand Rapids	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]
SW	Kent	Grand Rapids	145.410	WD8EMD	O	94.8	(ca) A e R Wx z	541 Inc	08/19/02
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]
SW	Kent	Grand Rapids	147.160	W8HVG	O		a e L Wx x z	IRA	02/23/01
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SW	Kent	Grand Rapids	224.440	WB8VOJ	O			IRA	12/01/02
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
SW	Kent	Grand Rapids	224.760	WD8KXA	O		A e	WD8KXA	11/18/02
[illegible]	[illegible]	[illegible]	224.880	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
SW	Kent	Grand Rapids	421.250	K8DMR	O		e x	K8DMR	11/18/01
SW	Kent	Grand Rapids	442.000	K8EFK	C			K8EFK	04/13/02
SW	Kent	Grand Rapids	442.175	K8SN	C		(ca) A e L R Wx	K8SN	07/28/02
SW	Kent	Grand Rapids	443.800	KA8YSM	O		a e L Wx x z	IRA	02/23/01
SW	Kent	Grand Rapids	444.100	N8NET	O		(ca) e Wx z	N8NET	10/20/01

SW	Kent	Grand Rapids	[illegible]	[illegible]	O		[illegible]	[illegible]	[illegible]
SW	Kent	Grand Rapids	[illegible]	[illegible]	[illegible]	94.8	[illegible]	[illegible]	[illegible]
SW	Kent	Grand Rapids	444.900	K8IHY	O	94.8	a e z	K8IHY	05/24/[illegible]
SW	Kent	Lowell	145.270	W8LRC	O	94.8	a A e Wx x z	LARC	11/07/02
SW	Kent	Rockford	442.075	K8KWD	O	114.8		K8KWD	[illegible]
SW	Kent	Sparta	444.775	AB8MS	O	94.8	a L p x	AB8MS	11/29/01
SW	[illegible]	Crystal Lake	442.125	KB8LCY	O		x	KB8LCY	09/08/99
SW	Muskegon	Fruitport	147.380	KE8LZ	O	94.8	A z	KE8LZ	11/24/02
SW	Muskegon	Fruitport	442.300	KE8LZ	O	94.8	L	KE8LZ	11/24/02
SW	Muskegon	Muskegon	145.330	W8HVG	O	94.8	a e L Wx x z	IRA	02/23/01
SW	Muskegon	Muskegon	146.820	K8WNJ	O	94.8	a A e R	MCARESG	09/14/01
SW	Muskegon	Muskegon	146.940	W8ZHO	O	94.8	a	MAARC	09/14/01
SW	Muskegon	Muskegon	224.700	N8KQQ	O	94.8	a e L	N8KQQ	06/05/01
SW	Muskegon	Muskegon	442.950	N8KQQ	O	94.8	a e L	N8KQQ	06/05/01
SW	Muskegon	Muskegon	443.200	N8UKF	O	94.8	A e	N8UKF	11/24/02
SW	Muskegon	Muskegon	444.550	W8ZHO	O	94.8		MAARC	09/14/01
SW	Muskegon	Whitehall	52.800	K8COP	C		(ca) A e R z	K8COP	01/28/02
SW	Muskegon	Whitehall	146.500	W8WPD	C		A e p R Wx	W-MES	01/28/02
SW	Muskegon	Whitehall	[illegible]	K8COP	O	94.8	[illegible] R	K8COP	[illegible]
SW	Muskegon	Whitehall	443.250	K8COP	O	94.8	x	K8COP	03/18/99
SW	Ottawa	Grand Haven	145.490	W8CSO	O	94.8	a A e L Wx z	NOARC	08/19/01
SW	Ottawa	Grand Haven	443.775	W8GVK	O	94.8		W8GVK	09/14/01
SW	Ottawa	Holland	146.500	K8DAA	O	94.8	A R Wx	HARC	02/24/01
SW	Ottawa	Holland	147.060	K8DAA	O	94.8	a A e L R Wx z	HARC	02/24/01
SW	Ottawa	Holland	443.825	K8DAA	O	94.8	A e L R Wx	HARC	02/24/01
SW	St Joseph	Centerville	145.310	WB8ZEQ	O	94.8	(ca) A e R Wx	ARPSA	12/05/02
SW	St Joseph	Centerville	442.150	N8IYX	O		(ca) A e R	ARPSA	12/05/02
SW	Van Buren	Bangor	147.360	WA8PRJ	O	94.8	A e R Wx	BRARC	03/12/01
SW	Van Buren	[illegible]	[illegible]	KF8ZF	O	94.8	[illegible]	BASR	06/04/99
SW	Van Buren	Gobles	224.740	N8OKU	O	94.8	e Wx	N8OKU	01/18/02
SW	Van Buren	Lawton	444.475	N8GH	O	94.8	e L	N8GH	11/29/01
SW	Van Buren	Mattawan	146.500	N8ZFU	O	127.3	e Wx	N8ZFU	08/20/01

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]

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ULS License

Public Safety Pool, Conventional License - KD52665

Call Sign	KD52665	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	12/09/1999	Expiration	01/25/2005
Effective	12/09/1999	Cancellation	

Control Points

1 550 W ALGONQUIN, ARLINGTON HEIGHTS, IL
P: (312)364-7223

Licensee

Licensee ID SGIN	000	FRN		Type	Governmental Entity

Licensee

PACE PUBLIC TRANSIT AUTHORITY
550 W ALGONQUIN
ARLINGTON HEIGHTS, IL 60005
ATTN MAURICE PANG

P:(312)364-7223

Contact

Land Mobile Data

Extended Implementation		Assoc.Call Signs	

Eligibility

90.17A

Qualifications, Ownership, and Demographics

Radio Service Type	Mobile		
Regulatory Status		Interconnected?	

Alien Ownership

Is the Applicant a foreign government or the representative of any foreign government?

Is the Applicant an alien or the representative of an alien?

Is the Applicant a corporation organized under the laws of any foreign government?

Is the Applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?

Is the Applicant directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign country?

Basic Qualifications

Has the Applicant or any party to this application or amendment had any FCC station authorization, license, or construction permit revoked or had any application for an initial, modification or renewal of FCC station authorization, license, construction permit denied by the Commission?

Has the Applicant or any party to this application or amendment, or any party directly or indirectly controlling the Applicant, ever been convicted of a felony by any state or federal court?

Has any court finally adjudged the Applicant or any party directly or indirectly controlling the Applicant guilty of unlawfully monopolizing or attempting unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement, or any other means or unfair methods of competition?

Is the Applicant or any party directly or indirectly controlling the Applicant, currently a party in any pending matter referred to in the preceding two items?

Race

Hispanic/Latino? Gender

Specified Search

Radio Service = **PW**
Licensee Name like **Laidlaw**
State = **Illinois**

Matches **1**- **10** (of **18**)

1 2 [Next: 11-18>>]

PA = Pending Application(s)

		Call Sign	Licensee Name	FRN	Radio Service	Status	Expiration Date
1	PA	KDM386	Laidlaw Transit, Inc	0001807452	PW	Active	06/17/2012
2	PA	KTG668	Laidlaw Transit, Inc.	0001807452	PW	Active	02/25/2012
3	PA	KYL625	LAIDLAW TRANSIT INC	0004569828	PW	Active	11/21/2003
4	PA	WPJS421	LAIDLAW TRANSIT INC	0004569828	PW	Active	10/02/2011
5	PA	WPJT772	LAIDLAW TRANSIT Inc.	0001807452	PW	Active	10/22/2011
6	PA	WPML203	LAIDLAW TRANSIT INC	0004569828	PW	Active	08/31/2003
7	PA	WPML204	LAIDLAW TRANSIT INC	0004569828	PW	Active	08/31/2003
8	PA	WPRR257	LAIDLAW TRANSIT INC	0004569828	PW	Active	12/21/2005
9	PA	WPRR507	LAIDLAW TRANSIT INC	0001807452	PW	Active	12/26/2010
10	PA	WPRR509	LAIDLAW TRANSIT INC	0004569828	PW	Active	12/26/2005

1 2 [Next: 11-18>>]

11	WPSF861	LAIDLAW TRANSIT INC DBA ROCHESTER SCHOOL BUS SERVICE	0001807452	PW	Active	04/10/2011
12	WPSR230	LAIDLAW TRANSIT INC	0001807452	PW	Active	07/16/2011
13	WPTB404	Laidlaw Transit Inc.	0004569828	PW	Active	08/22/2011
14	WPTB885	Laidlaw Transit Inc.	0004569828	PW	Active	08/24/2011
15	WPTN919	LAIDLAW TRANSIT INC	0001807452	PW	Active	11/13/2011
16	WPTV264	Laidlaw Transit, Inc.	0001807452	PW	Expired	06/20/2002
17	WPTV265	Laidlaw Transit, Inc.	0001807452	PW	Expired	06/20/2002
18	WPWG898	LAIDLAW TRANSIT INC.	0004569828	PW	Active	11/14/2012

Call Sign	WPSF861	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular
Dates			
Grant	04/10/2001	Expiration	04/10/2011
Effective	04/10/2001	Cancellation	
Control Points			
1	2021 NW 32 AVE, OLMSTED, ROCHESTER, MN P: (507)289-4541		

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	ON OLD HWY 14 2 MI W ROCHESTER, MN OLMSTED County	44-02-45.9 N, 092-30-38.6 W	P
2 - Mobile	40.0 km radius around a fixed location 1		

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
155.26500	1	1	1	FB	1		110.000	110.000
155.26500	2	1	1	MO	100		25.000	25.000

Call Sign	WPSR230	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular
Dates			
Grant	07/16/2001	Expiration	07/16/2011
Effective	07/16/2001	Cancellation	
Control Points			
1	15763 WEST APTAKISIC ROAD, LAKE, PRAIRIE VIEW, IL P: (847)634-1402		

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	BUTTERFIELD RD 1/10 MI N OF EJ AND E MUNDELEIN, IL LAKE County	42-14-51.0 N, 087-58-52.0 W	P
2 - Mobile	32.0 km radius around a fixed location 1		

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
155.17500	1	1	1	FB	1		50.000	50.000
155.17500	2	1	1	MO	100		25.000	25.000

Call Sign	WPRR507	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	12/26/2000	Expiration	12/26/2010
Effective	12/26/2000	Cancellation	

Control Points

1 1240 EAST DIEHL ROAD, NAPERVILLE, IL
P: (630)955-0003

1 - Fixed	1335 Franklin Grove Road Dixon, IL LEE County	41-50-20.1 N, 089-27-34.4 W
2 - Mobile	40.0 km radius around a fixed location 1	

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
155.20500	1	1	1	FB	1		110.000	100.000
155.20500	2	1	1	MO	50		25.000	

Call Sign	WPRR509	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	12/26/2000	Expiration	12/26/2005
Effective	12/26/2000	Cancellation	

Control Points

1 108 WESTVIEW PLAZA DRIVE, WATERLOO, IL
P: (618)939-8877

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	BELLEFONTAINE DR WATERLOO, IL MONROE County	38-20-18.2 N, 090-08-50.4 W	
2 - Mobile	40.0 km radius around a fixed location 1		

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
155.26500	1	1	1	FB	1		20.000	40.000
155.26500	2	1	1	MO	45		20.000	

Call Sign	WPTN919	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	11/13/2001	Expiration	11/13/2011
Effective	11/13/2001	Cancellation	

Control Points

1	455 ELM STREET, MACON, MT ZION, IL P: (217)864-5233

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	455 ELM STREET MT ZION, IL MACON County	39-46-11.0 N, 088-52-37.0 W	
2 - Mobile	32.0 km radius around a fixed location 1		

	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
155.17500	1	1	1	FB	1		20.000	50.000
155.17500	2	1	1	MO	35		25.000	25.000

Call Sign	WPTV264	Radio Service	PW - Public Safety Pool, Conventional
Status	Expired	Auth Type	Special Temporary

Dates

Grant	12/20/2001	Expiration	06/20/2002
Effective	12/20/2001	Cancellation	10/20/2002

Control Points

None

Call Sign	WPTV265	Radio Service	PW - Public Safety Pool, Conventional
Status	Expired	Auth Type	Special Temporary

Dates

Grant	12/20/2001	Expiration	06/20/2002
Effective	12/20/2001	Cancellation	10/20/2002

Control Points

None

Call Sign	WPTB404	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	08/22/2001	Expiration	08/22/2011
Effective	08/22/2001	Cancellation	

Control Points

1	1240 EAST DIEHL ROAD, DU PAGE, NAPERVILLE, IL P: (630)955-0003

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	1226 11th Street Booneville, MO COOPER County	38-58-28.0 N, 092-44-30.0 W	
2 - Mobile	40.0 km radius around a fixed location 1		

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
155.17500	1	1	1	FB	1		60.000	55.000
155.17500	2	1	1	MO	50		25.000	25.000

Call Sign	WPTB885	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	08/24/2001	Expiration	08/24/2011
Effective	08/24/2001	Cancellation	

Control Points

1	1240 EAST DIEHL ROAD, DU PAGE, NAPERVILLE, IL P: (630)955-0003

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	1306 North 10th Street Sauk Rapids, MN BENTON County	45-35-52.0 N, 094-09-26.0 W	
2 - Mobile	40.0 km radius around a fixed location 1		

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
33.04000	1	1	1	FB	1		50.000	100.000
33.04000	2	1	1	MO	55		50.000	50.000

Call Sign	KYL625	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	09/29/1998	Expiration	11/21/2003
Effective	09/29/1998	Cancellation	

Control Points

1 19TH & WASHINGTON, CAIRO, IL
P: (618)997-6449

SC = Special Condition

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Mobile	Other		
2 - Fixed	19TH & WASHINGTON CAIRO, IL ALEXANDER County	37-00-18.2 N, 089-10-37.3 W	
3 - Fixed	200 N 5TH ST MARION, IL WILLIAMSON County	37-44-02.2 N, 088-57-03.3 W	

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
155.17500	1	1	1	MO	52		35.000	
155.17500	2	1	1	FB	1		20.000	50.000
155.17500	3	1	1	FB	1		110.000	90.000

Call Sign	WPJS421	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	12/12/2001	Expiration	10/02/2011
Effective	12/12/2001	Cancellation	

Control Points

1 1215 DEER ST, YORKVILLE, IL
P: (630)552-1181

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	1215 DEER ST YORKVILLE, IL KENDALL County	41-37-37.1 N, 088-26-18.3 W	
2 - Mobile	40.0 km radius around a fixed location 1		

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
155.17500	1	1	1	FB	1		25.000	60.000
155.17500	2	1	1	MO	45		25.000	

Call Sign	KDM386	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	08/13/2002	Expiration	06/17/2012
Effective	08/13/2002	Cancellation	

Control Points

1 2743 BARTELLS DRIVE, BELOIT, WI
P: (608)365-9661

1 - Mobile	Other	
2 - Fixed	2743 BARTELLS DR BELOIT, WI ROCK County	42-33-01.1 N, 089-01-16.4 W

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
155.23500	1	1	1	MO	36		20.000	
155.23500	2	1	1	FB	1		45.000	

Call Sign	KTG668	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	05/29/2002	Expiration	02/25/2012
Effective	05/29/2002	Cancellation	

Control Points

1 650 SOUTH ST, ANOKA, MN
P: (612)421-3199

= Special Condition

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	650 SOUTH ST ANOKA, MN ANOKA County	45-11-25.9 N, 093-22-47.8 W	
2 - Mobile	32.0 km radius around a fixed location 1		

45.96000	1	1	1	FB	1	90.000	225.000
45.96000	2	1	1	MO	45	50.000	

Call Sign	WPJT772	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	01/02/2002	Expiration	10/22/2011
Effective	01/02/2002	Cancellation	

Control Points

1 115 S WILES, MACON, IL
P: (217)764-3626

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	115 S WILES MACON, IL MACON County	39-46-11.1 N, 088-52-37.3 W	
2 - Mobile	32.0 km radius around a fixed location 1		

155.17500	1	1	1	FB	1	20.000	50.000
155.17500	2	1	1	MO	31	10.000	

Call Sign	WPML203	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	08/31/1998	Expiration	08/31/2003
Effective	08/31/1998	Cancellation	

Control Points

1 23907 FARMINGTON RD, FARMINGTON, IL
P: (309)245-4561

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	23907 FARMINGTON RD FARMINGTON, IL FULTON County	40-41-57.1 N, 089-58-23.4 W	
2 - Mobile	40.0 km radius around a fixed location 1		

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
47.58000	1	1	1	FB	1		60.000	100.000
47.58000	2	1	1	MO	15		60.000	

Call Sign	WPML204	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	08/31/1998	Expiration	08/31/2003
Effective	08/31/1998	Cancellation	

Control Points

1 2260 LIME KILN RD, GREEN BAY, WI
P: (920)468-6515

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	JCT CTH JJ & OLD MANITOWOC RD GREEN BAY, WI BROWN County	44-27-55.0 N, 087-56-47.4 W	
2 - Mobile	40.0 km radius around a fixed location 1		

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
155.26500	1	1	1	FB	1		45.000	105.000
155.26500	2	1	1	MO	100		10.000	10.000

Call Sign	WPRR257	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	12/21/2000	Expiration	12/21/2005
Effective	12/21/2000	Cancellation	

Control Points

1 #17 COMMERCIAL COURT, GLEN CARBON, IL
P: (618)656-0125

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	# 17 COMMERCIAL COURT GLEN CARBON, IL MADISON County	38-47-02.2 N, 089-57-10.4 W	
2 - Mobile	40.0 km radius around a fixed location 1		

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
155.17500	1	1	1	FB	1		20.000	10.000
155.17500	2	1	1	MO	45		20.000	

Call Sign	WPWG898	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	11/14/2002	Expiration	11/14/2012
Effective	11/14/2002	Cancellation	

Control Points

1 1202 LEBANON ROAD, MADISON, COLLINSVILLE, IL
P: (618)346-8505

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	1202 LEBANON ROAD COLLINSVILLE, IL MADISON County	38-40-25.1 N, 089-58-25.0 W	
2 - Mobile	40.0 km radius around a fixed location 1		

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
155.23500	1	1	1	FB	1		25.000	50.000
155.23500	2	1	1	MO	35		25.000	25.000

Call Sign	WPSR230	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular

Dates

Grant	07/16/2001	Expiration	07/16/2011
Effective	07/16/2001	Cancellation	

Control Points

1 15763 WEST APTAKISIC ROAD, LAKE, PRAIRIE VIEW, IL
P: (847)634-1402

Location	Transmitter Address /Area of Operation	Latitude, Longitude	Status
1 - Fixed	BUTTERFIELD RD 1/10 MI N OF EJ AND E MUNDELEIN, IL LAKE County	42-14-51.0 N, 087-58-52.0 W	P
2 - Mobile	32.0 km radius around a fixed location 1		

Frequency	Loc#	Ant#	Freq ID	Station Class	Units	Paging Rec.	Output Power	Maximum ERP
155.17500	1	1	1	FB	1		50.000	50.000
155.17500	2	1	1	MO	100		25.000	25.000

Pending Applications
0001073036
0000981382

BUTTERFIELD RD 1/10 MI N OF EJ AND E
MUNDELEIN, IL
LAKE County

Coordinates 42-14-51.0 N, 087-58-52.0 W

Site Elevation (AMSL)	221.0m	Height w/o Appurtenances	34.0m
ASR #		Height w/ Appurtenances	34.0m
Site Structure	TOWER - A free standing or guyed structure		
Special Conditions	None		

Antenna 1

HAAT	34.0	Hgt to Tip	34.0m	Polarization	
Azimuth		Beamwidth		Gain	

Call Sign	KDM386	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular
Dates			
Grant	08/13/2002	Expiration	06/17/2012
Effective	08/13/2002	Cancellation	
Control Points			
1	2743 BARTELLS DRIVE, BELOIT, WI P: (608)365-9661		

Call Sign	KTG668	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular
Dates			
Grant	05/29/2002	Expiration	02/25/2012
Effective	05/29/2002	Cancellation	
Control Points			
1	650 SOUTH ST, ANOKA, MN P: (612)421-3199		

Call Sign	KYL625	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular
Dates			
Grant	09/29/1998	Expiration	11/21/2003
Effective	09/29/1998	Cancellation	
Control Points			
1	19TH & WASHINGTON, CAIRO, IL P: (618)997-6449		

Call Sign	WPJS421	Radio Service	PW - Public Safety Pool, Conventional
Status	Active	Auth Type	Regular
Dates			
Grant	12/12/2001	Expiration	10/02/2011
Effective	12/12/2001	Cancellation	
Control Points			
1	1215 DEER ST, YORKVILLE, IL P: (630)552-1181		

Elliott Broadcast Services - FCC FM Search Results

This data should be considered an unofficial secondary source.
See FCC Rules section 0.434 for further warnings and disclaimers.

Searching by city for **Chicago** in **IL** We found 47 matches.

WCRX 88.1 FM (Channel 201)Class A ERP:.100 kW horizontal /.090 kW vertical
Columbia College
Chicago IL
Coordinates: N41-52-22 W87-38-52. View map of antenna location.
Height Above Average Terrain (HAAT): 39 meters horiz 39 meters vert
Height above mean sea level (AMSL): 226 meters horizontal 226 meters vertical
Height above ground level (AGL): 44 meters horizontal 44 meters vertical
Record last updated by FCC on 03-27-1997 at 10:44:32. File # BLED851106KH
Station is directional.
Station is licensed with these facilities.

WSSD 88.1 FM (Channel 201)Class D ERP:.010 kW horizontal /.010 kW vertical
Lakeside Telecommunications Inc.
Chicago IL
Coordinates: N41-43-44 W87-33-3. View map of antenna location.
Height Above Average Terrain (HAAT): 31 meters horiz 31 meters vert
Height above mean sea level (AMSL): 209 meters horizontal 209 meters vertical
Height above ground level (AGL): 30 meters horizontal 30 meters vertical
Record last updated by FCC on 10-23-1996 at 07:31:01. File # BLED791022AA
Station is licensed with these facilities.

WXAV 88.3 FM (Channel 202)Class A ERP:0.15 kW horizontal /0.15 kW vertical
St. Xavier College
Chicago IL
Coordinates: N41-42-37 W87-42-54. View map of antenna location.
Height Above Average Terrain (HAAT): 39 meters horiz 39 meters vert
Height above mean sea level (AMSL): 224 meters horizontal 224 meters vertical
Height above ground level (AGL): 34 meters horizontal 34 meters vertical
Record last updated by FCC on 10-23-1996 at 07:36:28. File # BLED910819KB
Station is directional.
Station is licensed with these facilities.

WZRD 88.3 FM (Channel 202)Class A ERP:.100 kW horizontal /.100 kW vertical
Northeastern Illinois University
Chicago IL
Coordinates: N41-58-56 W87-43-7. View map of antenna location.
Height Above Average Terrain (HAAT): 22 meters horiz 22 meters vert
Height above mean sea level (AMSL): 209 meters horizontal 209 meters vertical
Height above ground level (AGL): 29 meters horizontal 29 meters vertical
Record last updated by FCC on 10-23-1996 at 07:40:46. File # BLED850221KP
Station is licensed with these facilities.

WHPKFM 88.5 FM (Channel 203)Class A ERP:.100 kW horizontal /.100 kW vertical

The University of Chicago
Chicago IL
Coordinates: N41-47-40 W87-35-55. View map of antenna location.
Height Above Average Terrain (HAAT): 37 meters horiz 37 meters vert
Height above mean sea level (AMSL): 220 meters horizontal 220 meters vertical
Height above ground level (AGL): 40 meters horizontal 40 meters vertical
Record last updated by FCC on 10-22-1996 at 09:49:37. File # BLED850611KC
Station is licensed with these facilities.

WLUW 88.7 FM (Channel 204)Class A ERP:.100 kW horizontal /.100 kW vertical
Loyola University of Chicago
Chicago IL
Coordinates: N42-0-4 W87-39-36. View map of antenna location.
Height Above Average Terrain (HAAT): 70 meters horiz 70 meters vert
Height above mean sea level (AMSL): 253 meters horizontal 253 meters vertical
Height above ground level (AGL): 77 meters horizontal 77 meters vertical
Record last updated by FCC on 10-22-1996 at 10:08:16. File # BLED840904CR
Station is licensed with these facilities.

WOUI 88.9 FM (Channel 205)Class D ERP:.017 kW horizontal / kW vertical
Illinois Institute of Technology
Chicago IL
Coordinates: N41-50-4 W87-37-43. View map of antenna location.
Height Above Average Terrain (HAAT): 27 meters horiz meters vert
Height above mean sea level (AMSL): 206 meters horizontal meters vertical
Height above ground level (AGL): 24 meters horizontal meters vertical
Record last updated by FCC on 10-22-1996 at 10:45:48. File # BLED910204KB
Station is licensed with these facilities.

WKKC 89.3 FM (Channel 207)Class A ERP:.250 kW horizontal /.185 kW vertical
Board of Trustees of Community College Dist. 508
Chicago IL
Coordinates: N41-46-15 W87-37-48. View map of antenna location.
Height Above Average Terrain (HAAT): 35 meters horiz 35 meters vert
Height above mean sea level (AMSL): 215 meters horizontal 215 meters vertical
Height above ground level (AGL): 34 meters horizontal 34 meters vertical
Record last updated by FCC on 10-22-1996 at 09:59:52. File # BLED900521KB
Station is directional.
Station is licensed with these facilities.

WMBIFM 90.1 FM (Channel 211)Class B ERP:100. kW horizontal / 52. kW vertical
Moody Bible Institute of Chicago
Chicago IL
Coordinates: N41-55-35 W88-0-22. View map of antenna location.
Height Above Average Terrain (HAAT): 134 meters horiz 134 meters vert
Height above mean sea level (AMSL): 350 meters horizontal 350 meters vertical
Height above ground level (AGL): 140 meters horizontal 140 meters vertical
Record last updated by FCC on 08-15-1997 at 14:52:16. File # BLED1017
Station is licensed with these facilities.

WMBIFM 90.1 (Channel 211)Class B ERP: 47. kW horizontal / 47. kW vertical

Moody Bible Institute of Chicago
Chicago IL
Coordinates: N41-55-41 W88-0-25. View map of antenna location.
Height Above Average Terrain (HAAT): 111 meters horiz 111 meters vert
Height above mean sea level (AMSL): 326 meters horizontal 326 meters vertical
Height above ground level (AGL): 116 meters horizontal 116 meters vertical
Record last updated by FCC on 03-18-1998 at 10:53:47. File # BLED971218KB
Station is licensed with these facilities.

WMBIFM 90.1 FM (Channel 211)Class B ERP:100. kW horizontal /100. kW vertical
Moody Bible Institute of Chicago
Chicago IL
Coordinates: N41-55-41 W88-0-25. View map of antenna location.
Height Above Average Terrain (HAAT): 135 meters horiz 135 meters vert
Height above mean sea level (AMSL): 350 meters horizontal 350 meters vertical
Height above ground level (AGL): 140 meters horizontal 140 meters vertical
Record last updated by FCC on 08-15-1997 at 14:51:45. File # BPED930322IE
This record is a construction permit.

WRTE 90.5 FM (Channel 213)Class D ERP:.008 kW horizontal /.008 kW vertical
Mexican Fine Arts Center Museum
Chicago IL
Coordinates: N41-50-26 W87-43-5. View map of antenna location.
Height Above Average Terrain (HAAT): 22 meters horiz 22 meters vert
Height above mean sea level (AMSL): 207 meters horizontal 207 meters vertical
Height above ground level (AGL): 25 meters horizontal 25 meters vertical
Record last updated by FCC on 11-02-1998 at 17:17:48. File # BLED880209KH
Station is licensed with these facilities.

WRTE 90.5 FM (Channel 213)Class A ERP: 0.1 kW horizontal / 0.1 kW vertical
Mexican Fine Arts Center Museum
Chicago IL
Coordinates: N41-50-26 W87-43-5. View map of antenna location.
Height Above Average Terrain (HAAT): 26 meters horiz 26 meters vert
Height above mean sea level (AMSL): 207 meters horizontal 207 meters vertical
Height above ground level (AGL): 25 meters horizontal 25 meters vertical
Record last updated by FCC on 12-09-1999 at 16:26:33. File # BPED981027MD
Application filed for these facilities.

WBHI 90.7 FM (Channel 214)Class D ERP:.007 kW horizontal /.007 kW vertical
Bogan High School
Chicago IL
Coordinates: N41-44-55 W87-43-13. View map of antenna location.
Height Above Average Terrain (HAAT): 17 meters horiz 17 meters vert
Height above mean sea level (AMSL): 203 meters horizontal 203 meters vertical
Height above ground level (AGL): 14 meters horizontal 14 meters vertical
Record last updated by FCC on 10-22-1996 at 09:17:41. File # BLED860207KG
Station is licensed with these facilities.

WBEZ 91.5 FM (Channel 218)Class B ERP: 8.3 kW horizontal / 8.3 kW vertical
WBEZ Alliance Inc.

Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): 360 meters horiz 360 meters vert
Height above mean sea level (AMSL): 539 meters horizontal 539 meters vertical
Height above ground level (AGL): 359 meters horizontal 359 meters vertical
Record last updated by FCC on 11-14-1996 at 10:01:32. File # BLED850628KL
Station is licensed with these facilities.

WXRT 93.1 FM (Channel 226)Class B ERP: 6.7 kW horizontal / 6.7 kW vertical
Group W Broadcasting Inc.
Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): 399 meters horiz 399 meters vert
Height above mean sea level (AMSL): 579 meters horizontal 579 meters vertical
Height above ground level (AGL): 398 meters horizontal 398 meters vertical
Record last updated by FCC on 10-23-1996 at 07:38:02. File # BLH810930AF
Station is directional.
Station is licensed with these facilities.

93.1 (Table of Allotments allocation for Chicago)
(Channel 226)Class B ERP: kW horizontal / kW vertical

Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical
Record last updated by FCC on 12-01-1990 at 00:00:00.

93.9 (Table of Allotments allocation for Chicago)
(Channel 230)Class B ERP: kW horizontal / kW vertical

Chicago IL
Coordinates: N41-52-44 W87-38-10. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical
Record last updated by FCC on 12-01-1990 at 00:00:00.

WLITFM 93.9 FM (Channel 230)Class B ERP: 4.0 kW horizontal / 4.0 kW vertical
Chancellor Media Radio Licenses L.L.C
Chicago IL
Coordinates: N41-52-44 W87-38-8. View map of antenna location.
Height Above Average Terrain (HAAT): 482 meters horiz 482 meters vert
Height above mean sea level (AMSL): 663 meters horizontal 663 meters vertical
Height above ground level (AGL): 482 meters horizontal 482 meters vertical
Record last updated by FCC on 12-29-1998 at 15:14:24. File # BPH980921ID
This record is a construction permit.

WLITFM 93.9 FM (Channel 230)Class B ERP: 4.0 kW horizontal / 4.0 kW vertical
Viacom Broadcasting Inc.
Chicago IL
Coordinates: N41-52-44 W87-38-10. View map of antenna location.

Height Above Average Terrain (HAAT): 482 meters horiz 482 meters vert
Height above mean sea level (AMSL): 663 meters horizontal 663 meters vertical
Height above ground level (AGL): 482 meters horizontal 482 meters vertical
Record last updated by FCC on 01-06-1994 at 11:46:00. File # BLH830301AG
Station is licensed with these facilities.

94.7 (Table of Allotments allocation for Chicago)
(Channel 234)Class B ERP: kW horizontal / kW vertical

Chicago IL
Coordinates: N41-52-44 W87-38-10. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical
Record last updated by FCC on 12-01-1990 at 00:00:00.

WXCD 94.7 FM (Channel 234)Class B ERP: 4.4 kW horizontal / 4.4 kW vertical
WLS-FM Radio Inc.
Chicago IL
Coordinates: N41-52-44 W87-38-10. View map of antenna location.
Height Above Average Terrain (HAAT): 466 meters horiz 466 meters vert
Height above mean sea level (AMSL): 649 meters horizontal 649 meters vertical
Height above ground level (AGL): 468 meters horizontal 468 meters vertical
Record last updated by FCC on 06-02-1997 at 10:02:27. File # BLH830621AE
Station is licensed with these facilities.

95.5 (Table of Allotments allocation for Chicago)
(Channel 238)Class B ERP: kW horizontal / kW vertical

Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical
Record last updated by FCC on 12-01-1990 at 00:00:00.

WNUA 95.5 FM (Channel 238)Class B ERP: 8.3 kW horizontal / 8.3 kW vertical
Evergreen Media Corporation
Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): 358 meters horiz 358 meters vert
Height above mean sea level (AMSL): 538 meters horizontal 538 meters vertical
Height above ground level (AGL): 357 meters horizontal 357 meters vertical
Record last updated by FCC on 10-22-1996 at 10:43:41. File # BLH881011KC
Station is licensed with these facilities.

96.3 (Table of Allotments allocation for Chicago)
(Channel 242)Class B ERP: kW horizontal / kW vertical

Chicago IL
Coordinates: N41-52-44 W87-38-10. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical

Record last updated by FCC on 12-01-1990 at 00:00:00.

WBBMFM 96.3 FM (Channel 242)Class B ERP: 4.2 kW horizontal / 4.2 kW vertical
CBS Inc.
Chicago IL
Coordinates: N41-52-44 W87-38-10. View map of antenna location.
Height Above Average Terrain (HAAT): 474 meters horiz 474 meters vert
Height above mean sea level (AMSL): 655 meters horizontal 655 meters vertical
Height above ground level (AGL): 474 meters horizontal 474 meters vertical
Record last updated by FCC on 01-06-1994 at 12:00:22. File # BLH891019KA
Station is directional.
Station is licensed with these facilities.

WNIB 97.1 FM (Channel 246)Class B ERP: 8.4 kW horizontal / 7.5 kW vertical
Northern Illinois B/Cing Co. Inc.
Chicago IL
Coordinates: N41-53-8 W87-37-15. View map of antenna location.
Height Above Average Terrain (HAAT): 363 meters horiz 363 meters vert
Height above mean sea level (AMSL): 541 meters horizontal 541 meters vertical
Height above ground level (AGL): 361 meters horizontal 361 meters vertical
Record last updated by FCC on 10-22-1996 at 10:22:35. File # BLH840515CP
Station is directional.
Station is licensed with these facilities.

97.1 (Table of Allotments allocation for Chicago)
(Channel 246)Class B ERP: kW horizontal / kW vertical

Chicago IL
Coordinates: N41-53-8 W87-37-15. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical
Record last updated by FCC on 12-01-1990 at 00:00:00.

WLUPFM 97.9 FM (Channel 250)Class B ERP: 6.0 kW horizontal / 6.0 kW vertical
WLUP-FM License Corporation
Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): 357 meters horiz 357 meters vert
Height above mean sea level (AMSL): 538 meters horizontal 538 meters vertical
Height above ground level (AGL): 358 meters horizontal 358 meters vertical
Record last updated by FCC on 08-14-1997 at 11:30:26. File # BMLH891106KC
Station is licensed with these facilities.

97.9 (Table of Allotments allocation for Chicago)
(Channel 250)Class B ERP: kW horizontal / kW vertical

Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical
Record last updated by FCC on 12-01-1990 at 00:00:00.

98.7 (Table of Allotments allocation for Chicago)
(Channel 254)Class B ERP: kW horizontal / kW vertical
g
Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical
Record last updated by FCC on 12-01-1990 at 00:00:00.

WFMT 98.7 FM (Channel 254)Class B ERP:15.5 kW horizontal /15.5 kW vertical
Window to the World Communications
Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): 357 meters horiz 357 meters vert
Height above mean sea level (AMSL): 538 meters horizontal 538 meters vertical
Height above ground level (AGL): 349 meters horizontal 349 meters vertical
Record last updated by FCC on 04-24-1997 at 08:47:59. File # BLH5189
Station is licensed with these facilities.

WFMT 98.7 FM (Channel 254)Class B ERP: 6. kW horizontal / 6. kW vertical
Window to the World Communications
Chicago IL
Coordinates: N41-52-44 W87-38-8. View map of antenna location.
Height Above Average Terrain (HAAT): 470 meters horiz 470 meters vert
Height above mean sea level (AMSL): 651 meters horizontal 651 meters vertical
Height above ground level (AGL): 470 meters horizontal 470 meters vertical
Record last updated by FCC on 08-17-1999 at 17:21:37. File # BPH980129IB
Application filed for these facilities.

WUSN 99.5 FM (Channel 258)Class B ERP: 8.3 kW horizontal / 8.3 kW vertical
Infinity Broadcasting Corporation of Chicago
Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): 358 meters horiz 358 meters vert
Height above mean sea level (AMSL): 538 meters horizontal 538 meters vertical
Height above ground level (AGL): 357 meters horizontal 357 meters vertical
Record last updated by FCC on 10-23-1996 at 07:34:06. File # BLH891214KB
Station is licensed with these facilities.

99.5 (Table of Allotments allocation for Chicago)
(Channel 258)Class B ERP: kW horizontal / kW vertical

Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical
Record last updated by FCC on 12-01-1990 at 00:00:00.

WNND 100.3 FM (Channel 262)Class B ERP: 8.3 kW horizontal / 8.3 kW vertical
WPNT License Corporation
Chicago IL

Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): 358 meters horiz 358 meters vert
Height above mean sea level (AMSL): 538 meters horizontal 538 meters vertical
Height above ground level (AGL): 357 meters horizontal 357 meters vertical
Record last updated by FCC on 11-12-1997 at 09:23:25. File # BLH891120KC
Station is licensed with these facilities.

100.3 (Table of Allotments allocation for Chicago)
(Channel 262)Class B ERP: kW horizontal / kW vertical

Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical
Record last updated by FCC on 12-01-1990 at 00:00:00.

101.1 (Table of Allotments allocation for Chicago)
(Channel 266)Class B ERP: kW horizontal / kW vertical

Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical
Record last updated by FCC on 12-01-1990 at 00:00:00.

WKQX 101.1 FM (Channel 266)Class B ERP: 8.3 kW horizontal / 8.3 kW vertical
Emmis FM Broadcasting Corporation of Chicago
Chicago IL
Coordinates: N41-53-56 W87-37-23. View map of antenna location.
Height Above Average Terrain (HAAT): 358 meters horiz 358 meters vert
Height above mean sea level (AMSL): 538 meters horizontal 538 meters vertical
Height above ground level (AGL): 357 meters horizontal 357 meters vertical
Record last updated by FCC on 04-11-1995 at 16:06:32. File # BLH940810KB
Station is licensed with these facilities.

103.5 (Table of Allotments allocation for Chicago)
(Channel 278)Class B ERP: kW horizontal / kW vertical

Chicago IL
Coordinates: N41-52-44 W87-38-10. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical
Record last updated by FCC on 12-01-1990 at 00:00:00.

WUBT 103.5 FM (Channel 278)Class B ERP: 4.3 kW horizontal / 4.3 kW vertical
WRCX License Corporation
Chicago IL
Coordinates: N41-52-44 W87-38-10. View map of antenna location.
Height Above Average Terrain (HAAT): 472 meters horiz 472 meters vert
Height above mean sea level (AMSL): 653 meters horizontal 653 meters vertical
Height above ground level (AGL): 471 meters horizontal 471 meters vertical

Record last updated by FCC on 01-05-1999 at 17:06:35. File # BLH890105KF
Station is licensed with these facilities.

WJMK 104.3 FM (Channel 282)Class B ERP: 4.1 kW horizontal / 4.1 kW vertical
Infinity Broadcasting Corporation of Illinois
Chicago IL
Coordinates: N41-52-44 W87-38-10. View map of antenna location.
Height Above Average Terrain (HAAT): 480 meters horiz 480 meters vert
Height above mean sea level (AMSL): 659 meters horizontal 659 meters vertical
Height above ground level (AGL): 478 meters horizontal 478 meters vertical
Record last updated by FCC on 07-29-1996 at 08:31:14. File # BLH870506KJ
Station is licensed with these facilities.

104.3 (Table of Allotments allocation for Chicago)
(Channel 282)Class B ERP: kW horizontal / kW vertical

Chicago IL
Coordinates: N41-52-44 W87-38-10. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical
Record last updated by FCC on 12-01-1990 at 00:00:00.

107.5 (Table of Allotments allocation for Chicago)
(Channel 298)Class B ERP: kW horizontal / kW vertical

Chicago IL
Coordinates: N41-52-57 W87-38-15. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal meters vertical
Record last updated by FCC on 12-01-1990 at 00:00:00.

WGCIFM 107.5 FM (Channel 298)Class B ERP: 33. kW horizontal / 33. kW vertical
Pacific & Southern Company Inc.
Chicago IL
Coordinates: N41-52-57 W87-38-15. View map of antenna location.
Height Above Average Terrain (HAAT): 183 meters horiz 183 meters vert
Height above mean sea level (AMSL): 364 meters horizontal 364 meters vertical
Height above ground level (AGL): 184 meters horizontal 184 meters vertical
Record last updated by FCC on 10-22-1996 at 09:42:41. File # BLH810324AB
Station is licensed with these facilities.

WGCIFM 107.5 FM (Channel 298)Class B ERP: 3.7 kW horizontal / 3.7 kW vertical
Chancellor Media Illinois License Corp.
Chicago IL
Coordinates: N41-52-44 W87-38-8. View map of antenna location.
Height Above Average Terrain (HAAT): 472 meters horiz 472 meters vert
Height above mean sea level (AMSL): 653 meters horizontal 653 meters vertical
Height above ground level (AGL): 472 meters horizontal 472 meters vertical
Record last updated by FCC on 12-01-1998 at 13:15:18. File # BPH980827IC
This record is a construction permit.

WLEY-FM1 107.9 (booster) (Channel 300)Class D ERP: kW horizontal /.080 kW vertical

Spanish Broadcasting System of Illinois Inc.
Chicago IL
Coordinates: N41-52-13 W87-40-22. View map of antenna location.
Height Above Average Terrain (HAAT): meters horiz meters vert
Height above mean sea level (AMSL): meters horizontal 249 meters vertical
Record last updated by FCC on 01-24-1900 at 13:37:30. File # BPFTB990610TH
Station is directional.
This record is a construction permit.

Questions or comments? Contact Elliott Broadcast Services at: ebs@radiostation.com.
Check out the SBE (Society of Broadcast Engineers) web site.

If you have any corrections to the engineering database or you have discovered an error in the database, please e-mail Jorden Brinn at the FCC with the details including FCC file number.

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Thanks for connecting from ip-20-152-73.chicago-n.navipath.net
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FM List

Data errors should be reported to Kim Nguyen, kpnguyen@fcc.gov.
Comments on the FM Query or FM List may be directed to Dale Bickel, dbickel@fcc.gov.

Notice: This query uses data extracted from the Mass Media Bureau's Consolidated DataBase System (CDBS). This data is unofficial. The public database files used to generate the FM Query may be downloaded from the cdbs directory at ftp://ftp.fcc.gov/pub/Bureaus/Mass_Media/Databases/.

- The FCC does not keep records of programming aired on radio broadcast stations.

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Use the FM Query to retrieve additional information about individual stations.
This document is best printed in LANDSCAPE  printer mode.

Class L1 = 100 watt LPFM; Class L2 = 10 watt LPFM station or application
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Callsign	Channel	Frequency	Class	Service	City	State	Country	FileNumber	FacilityID	ERP (max)	HAAT(H&V)	RCAMSL(H&V)	RCAGL(H&V)	Coordinates Lat
WSSD	201	88.1 MHz	D	FM LIC	CHICAGO	IL	US	BLED -19791022AA	36428	.010 kW	31.031.0	209.0 209.0	30.0 30.0	N Lat 41° 43' 44.0
WLTL	201	88.1 MHz	A	FM LIC	LA GRANGE	IL	US	BLED -19850903KW	39369	.180 kW	42.042.0	229.0 229.0	30.0 30.0	N Lat 41° 48' 45.0
WCRX	201	88.1 MHz	A	FM LIC	CHICAGO	IL	US	BLED -19851106KH	12424	.100 kW	39.039.0	226.0 226.0	44.0 44.0	N Lat 41° 52' 22.0
WNTH	201	88.1 MHz	A	FM LIC	WINNETKA	IL	US	BLED -19860210KF	6052	.100 kW	25.025.0	218.0 218.0	30.0 30.0	N Lat 42° 05' 40.0
WMWK	201	88.1 MHz	A	FM LIC	MILWAUKEE	WI	US	BLED -19901214KC	21010	.170 kW	291.	476.0	280.	N Lat 43° 05' 24.0
WAES	201	88.1 MHz	A	FM CP	LINCOLNSHIRE	IL	US	BPED -19951124MK	76042	.150 kW	15.015.0	227.0 227.0	23.0 23.0	N Lat 42° 11' 59.0
WBMF	201	88.1 MHz	A	FM CP	CRETE	IL	US	BPED -19971128MA	89339	.090 kW	114.114.	330.0 330.0	94.0 94.0	N Lat 41° 25' 17.0
980827ME	201	88.1 MHz	A	FM APP	ELGIN	IL	US	BPED -19980827ME	91561	.125 kW	31.0	296.0	21.0	N Lat 42° 06' 21.0
981006MN	201	88.1 MHz	A	FM APP	SPRING VALLEY	IL	US	BPED -19981006MN	91823	4.00 kW	87.0	281.0	81.0	N Lat 41° 15' 36.0
990319MH	201	88.1 MHz	A	FM APP	CARPENTERSVILLE	IL	US	BPED -19990319MH	93049	2.00 kW	33.0	296.0	21.0	N Lat 42° 06' 21.0
WLRA	201	88.1 MHz	A	FM LIC	LOCKPORT	IL	US	BLED -1116	37190	.250 kW	29.029.0	227.0 227.0	29.0 29.0	N Lat 41° 36' 6.00
WETN	201	88.1 MHz	A	FM LIC	WHEATON	IL	US	BLED -19990921ABJ	66499	.250 kW	43.043.0	266.0 266.0	31.0 31.0	N Lat 41° 52' 9.00
WSSD	201	88.1 MHz	A	FM APP	CHICAGO	IL	US	BPED -20000314ABN	36428	.240 kW	29.029.0	209.0 209.0	29.0 29.0	N Lat 41° 43' 44.0
981006MN	201	88.1 MHz	A	FM APP	SPRING VALLEY	IL	US	BPED -19981006MN	91823	4.00 kW	80.0	268.0	70.0	N Lat 41° 17' 32.0
WLRA	201	88.1 MHz	A	FM APP	LOCKPORT	IL	US	BPED -20011010ABR	37190	.140 kW	40.040.0	228.0 228.0	41.0 41.0	N Lat 41° 36' 10.0
WZRD	202	88.3 MHz	A	FM LIC	CHICAGO	IL	US	BLED -19850221KP	49444	.100 kW	22.022.0	209.0 209.0	29.0 29.0	N Lat 41° 58' 56.0
WDSO	202	88.3 MHz	A	FM LIC	CHESTERTON	IN	US	BLED -19851119KC	17731	.410 kW	41.041.0	243.0 243.0	48.0 48.0	N Lat 41° 36' 43.0
WXAV	202	88.3 MHz	A	FM LIC	CHICAGO	IL	US	BLED -19910819KB	62179	.150 kW	39.039.0	224.0 224.0	34.0 34.0	N Lat 41° 42' 37.0
WHCM	202	88.3 MHz	A	FM CP	PALATINE	IL	US	BPED -19930111MB	72720	.100 kW	24.024.0	256.0 256.0	21.0 21.0	N Lat 42° 04' 55.0
WCLR	202	88.3 MHz	A	FM CP	ARLINGTON HEIGHTS	IL	US	BPED -19930414MB	11186	1.00 kW	32.032.0	248.0 248.0	31.0 31.0	N Lat 42° 05' 22.0
WFEN	202	88.3 MHz	B	FM LIC	ROCKFORD	IL	US	BLED -19970630KF	20468	8.50 kW	175.175.	413.0 413.0	145. 145.	N Lat 42° 21' 48.0
WDGC-FM	202	88.3 MHz	A	FM LIC	DOWNERS GROVE	IL	US	BLED -1271	59285	.250 kW	40.0	258.0	16.0	N Lat 41° 48' 16.0
WDSO	202	88.3 MHz	A	FM CP	CHESTERTON	IN	US	BPED -20000328AHV	17731	.400 kW	41.041.0	241.0 241.0	45.0 45.0	N Lat 41° 36' 29.0
WAWF	202	88.3 MHz	A	FM LIC	KANKAKEE	IL	US	BLED -20000512AAE	78927	1.25 kW	87.087.0	279.0 279.0	91.0 91.0	N Lat 41° 04' 39.0
WHFH	203	88.5 MHz	A	FM LIC	FLOSSMOOR	IL	US	BLED -19800513AE	12922	1.50 kW	28.0	236.0	26.0	N Lat 41° 32' 43.0
WHPK-FM	203	88.5 MHz	A	FM LIC	CHICAGO	IL	US	BLED -19850611KC	69000	.100 kW	37.037.0	220.0 220.0	40.0 40.0	N Lat 41° 47' 40.0
WHSD	203	88.5 MHz	A	FM LIC	HINSDALE	IL	US	BLED -19860522KA	27263	.125 kW	40.040.0	254.0 254.0	30.0 30.0	N Lat 41° 47' 18.0
W203AJ	203	88.5 MHz	D	FX LIC	MICHIGAN CITY	IN	US	BLFT -19951024TB	1618	.013 kW	86.086.0	302.0 302.0	40.0 40.0	N Lat 41° 40' 7.00
971216MA	203	88.5 MHz	A	FM APP	MICHIGAN CITY	IN	US	BPED -19971216MA	89459	1.00 kW	86.086.0	302.0 302.0	40.0 40.0	N Lat 41° 40' 7.00
980417MD	203	88.5 MHz	A	FM APP	PINGREE GROVE	IL	US	BPED -19980417MD	90494	.380 kW	77.077.0	346.0 346.0	25.0 25.0	N Lat 42° 01' 12.0
980512MJ	203	88.5 MHz	A	FM APP	MICHIGAN CITY	IN	US	BPED -19980512MJ	90678	1.50 kW	21.021.0	220.0 220.0	16.0 16.0	N Lat 41° 44' 34.0
WGBK	203	88.5 MHz	A	FM CP MOD	GLENVIEW	IL	US	BMPED -19980720IG	42125	.185 kW	32.032.0	226.0 226.0	27.0 27.0	N Lat 42° 06' 39.0
980720MB	203	88.5 MHz	A	FM APP	PINGREE GROVE	IL	US	BPED -19980720MB	91199	.100 kW	100.100.	368.0 368.0	56.0 56.0	N Lat 42° 01' 5.00
WGBK	203	88.5 MHz	A	FM LIC	GLENVIEW	IL	US	BLED -19990913AAD	42125	.185 kW	32.032.0	226.0 226.0	27.0 27.0	N Lat 42° 06' 39.0
	203	88.5 MHz	A	FM APP	ZION	IL	US	BNPED -20000314ABT	123082	.450 kW	56.0	274.0	53.0	N Lat 42° 27' 15.0

980417ME	203	88.5	MHz	A	FM	APP	LOWELL	IN	US	BPED	-19980417ME	90498	1.50	kW	51.051.0	260.0	260.0	50.0	50.0	N	Lat	41°	04'	59.0
WLUW	204	88.7	MHz	A	FM	LIC	CHICAGO	IL	US	BLED	-19840904CR	38939	.100	kW	70.070.0	253.0	253.0	77.0	77.0	N	Lat	42°	00'	4.00
WRSE	204	88.7	MHz	A	FM	LIC	ELMHURST	IL	US	BLED	-19850930KA	4299	.100	kW	29.029.0	236.0	236.0	23.0	23.0	N	Lat	41°	53'	46.0
WCSF	204	88.7	MHz	A	FM	LIC	JOLIET	IL	US	BLED	-19880916KB	12283	.100	kW	39.039.0	230.0	230.0	33.0	33.0	N	Lat	41°	31'	58.0
WERN	204	88.7	MHz	B	FM	LIC	MADISON	WI	US	BLED	-19951026KA	63030	20.5	kW	385.385.	686.0	686.0	343.	343.	N	Lat	43°	03'	21.0
WERN	204	88.7	MHz	B	FS	LIC	MADISON	WI	US	BLED	-19960530KD	63030	12.5		168.168.	468.0	468.0	125.	125.	N	Lat	43°	03'	21.0
980512MC	204	88.7	MHz	B1	FM	APP	RIVERSIDE	MI	US	BPED	-19980512MC	90658	25.0	kW	56.056.0	240.0	240.0	43.0	43.0	N	Lat	42°	04'	22.0
981211MF	204	88.7	MHz	A	FM	APP	BRISTOL	IL	US	BPED	-19981211MF	92329	1.00	kW	67.067.0	276.0	276.0	75.0	75.0	N	Lat	41°	42'	16.0
990628MG	204	88.7	MHz	A	FM	APP	SUGAR GROVE	IL	US	BPED	-19990628MG	93787	2.65	kW	81.081.0	287.0	287.0	78.0	78.0	N	Lat	41°	42'	24.0
WGVE-FM	204	88.7	MHz	A	FM	LIC	GARY	IN	US	BLED	-714	23278	2.10	kW	28.0	219.0		33.0		N	Lat	41°	33'	15.0
WMXM	205	88.9	MHz	A	FM	LIC	LAKE FOREST	IL	US	BLED	-19800904AA	36309	.300	kW	34.0	236.0		15.0		N	Lat	42°	15'	0.00
WYMS	205	88.9	MHz	B1	FM	LIC	MILWAUKEE	WI	US	BMLED	-19820930AA	42669	1.50	kW	265.	479.0		275.		N	Lat	43°	05'	24.0
WARG	205	88.9	MHz	A	FM	LIC	SUMMIT	IL	US	BLED	-19851106KC	12921	.500	kW	25.025.0	218.0	218.0	30.0	30.0	N	Lat	41°	46'	36.0
WRRG	205	88.9	MHz	A	FM	LIC	RIVER GROVE	IL	US	BLED	-19860926KC	68153	.100	kW	39.039.0	234.0	234.0	42.0	42.0	N	Lat	41°	54'	56.0
WEPS	205	88.9	MHz	A	FM	LIC	ELGIN	IL	US	BLED	-19861120KD	4266	.740	kW	10.010.0	259.0	259.0	27.0	27.0	N	Lat	42°	02'	17.0
WIIT	205	88.9	MHz	D	FM	LIC	CHICAGO	IL	US	BLED	-19910204KB	28307	.017	kW	27.0	206.0		24.0		N	Lat	41°	50'	4.00
WWGN	205	88.9	MHz	A	FM	LIC	OTTAWA	IL	US	BLED	-19941003KA	13926	1.50	kW	197.197.	380.0	380.0	188.	188.	N	Lat	41°	16'	51.0
WJCG	205	88.9	MHz	A	FM	LIC	MONEE	IL	US	BLED	-19950929KA	43708	.100	kW	25.0		245.0		13.0	N	Lat	41°	27'	58.0
W205AZ	205	88.9	MHz	D	FX	LIC	KANKAKEE	IL	US	BLFT	-19980609TD	79410	.010	kW	83.0		277.0		84.0	N	Lat	41°	07'	22.0
WBSD	206	89.1	MHz	A	FM	LIC	BURLINGTON	WI	US	BLED	-19810827AA	7837	.215	kW	28.0	267.0		30.0		N	Lat	42°	40'	14.0
WONC	206	89.1	MHz	A	FM	LIC	NAPERVILLE	IL	US	BLED	-19940809KC	49179	1.50	kW	50.050.0	264.0	264.0	49.0	49.0	N	Lat	41°	46'	34.0
971121MA	206	89.1	MHz	A	FM	APP	LOWELL	IN	US	BPED	-19971121MA	89212	1.50	kW	79.079.0	288.0	288.0	72.0	72.0	N	Lat	41°	19'	24.0
980127MB	206	89.1	MHz	A	FM	APP	LYNWOOD	IL	US	BPED	-19980127MB	89851	1.00	kW	30.030.0	233.0	233.0	30.0	30.0	N	Lat	41°	28'	1.00
980415MA	206	89.1	MHz	A	FM	APP	LOWELL	IN	US	BPED	-19980415MA	90482	4.50	kW	65.065.0	273.0	273.0	57.0	57.0	N	Lat	41°	19'	14.0
W206AI	206	89.1	MHz	D	FX	LIC	LAKE VILLA	IL	US	BLFT	-19980630TE	8436	.080	kW	47.8		271.0		21.0	N	Lat	42°	25'	18.0
WNIE	206	89.1	MHz	B1	FM	LIC	FREEPORT	IL	US	BLED	-19990528KA	49555	6.00	kW	110.110.	368.0	368.0	114.	114.	N	Lat	42°	18'	45.0
WBSD	206	89.1	MHz	A	FM	CP	BURLINGTON	WI	US	BPED	-20000424AAK	7837	.220	kW	24.024.0	275.0	275.0	38.0	38.0	N	Lat	42°	40'	17.0
WBSD	206	89.1	MHz	A	FM	APP	BURLINGTON	WI	US	BMPED	-20010720ACG	7837	.210	kW	28.028.0	267.0	267.0	30.0	30.0	N	Lat	42°	40'	14.0
WKKC	207	89.3	MHz	A	FM	LIC	CHICAGO	IL	US	BLED	-19900521KB	6115	.250	kW	35.035.0	215.0	215.0	34.0	34.0	N	Lat	41°	46'	15.0
W207BI	207	89.3	MHz	D	FX	CP	UNIVERSITY PARK	IL	US	BPFT	-19990407TJ	91911	.013	kW	118.	309.0	309.0	125.	125.	N	Lat	41°	37'	15.0
W207BJ	207	89.3	MHz	D	FX	CP	MOUNT PROSPECT	IL	US	BPFT	-19990520TQ	93464	.050	kW	44.0	253.0	253.0	46.0	46.0	N	Lat	42°	01'	51.0
WNUR-FM	207	89.3	MHz	B1	FM	LIC	EVANSTON	IL	US	BLED	-1609	49779	7.20	kW	30.030.0	218.0	218.0	35.0	35.0	N	Lat	42°	03'	12.0
	207	89.3	MHz	A	FM	APP	MINOOKA	IL	US	BNPED	-20000301AAF	122692	.100	kW	60.0		235.0		61.0	N	Lat	41°	29'	47.0
WNIU	208	89.5	MHz	B	FM	LIC	DEKALB	IL	US	BLED	-19891011KA	49550	50.0	kW	128.128.	380.0	380.0	144.	144.	N	Lat	42°	00'	55.0
WAJW	208	89.5	MHz	B1	FM	LIC	CHESTERTON	IN	US	BLED	-19990813KA	3248	7.00	kW	66.066.0	262.0	262.0	76.0	76.0	N	Lat	41°	42'	58.0
WAJW	208	89.5	MHz	B1	FM	CP	CHESTERTON	IN	US	BPED	-20000223ABQ	3248	23.0	kW	57.057.0	262.0	262.0	76.0	76.0	N	Lat	41°	42'	58.0
WUWM	209	89.7	MHz	B	FM	LIC	MILWAUKEE	WI	US	BLED	-19840625DH	4285	15.5	kW	265.265.	472.0	472.0	276.	276.	N	Lat	43°	05'	24.0
WONU	209	89.7	MHz	B	FM	LIC	KANKAKEE	IL	US	BLED	-19860908KA	50284	35.0	kW	126.126.	322.0	322.0	118.	118.	N	Lat	41°	09'	24.0
WUBS	209	89.7	MHz	A	FM	LIC	SOUTH BEND	IN	US	BLED	-19930128KA	28881	1.50	kW	24.024.0	255.0	255.0	38.0	38.0	N	Lat	41°	40'	51.0
WUBS	209	89.7	MHz	A	FM	APP	SOUTH BEND	IN	US	BPED	-19980408MD	28881	2.20	kW	68.068.0	299.0	299.0	86.0	86.0	N	Lat	41°	40'	51.0
WTHS	210	89.9	MHz	A	FM	LIC	HOLLAND	MI	US	BLED	-19850425LP	27622	1.00	kW	47.047.0	245.0	245.0	59.0	59.0	N	Lat	42°	47'	16.0
980401MA	210	89.9	MHz	A	FM	APP	BENTON HARBOR	MI	US	BPED	-19980401MA	90387	.275	kW	101.101.	303.0	303.0	81.0	81.0	N	Lat	42°	04'	19.0
980909MM	210	89.9	MHz	A	FM	APP	BENTON HARBOR	MI	US	BPED	-19980909MM	91615	1.00	kW	103.		305.0		83.0	N	Lat	42°	04'	19.0
980909MQ	210	89.9	MHz	A	FM	APP	BENTON HARBOR	MI	US	BPED	-19980909MQ	91618	.250	kW	102.102.	305.0	305.0	83.0	83.0	N	Lat	42°	04'	19.0
WORT	210	89.9	MHz	B1	FM	LIC	MADISON	WI	US	BLED	-19990208KB	3596	2.00	kW	286.286.	582.0	582.0	258.	258.	N	Lat	43°	03'	3.00
	210	89.9	MHz	A	FM	APP	BROOKVILLE	IL	US	BNPED	-19991019AAL	106688	3.85	kW	370.	371.2		76.2		N	Lat	42°	04'	7.00
NEW	210	89.9	MHz	L2	FL	APP	CHICAGO	IL	US	BNPL	-20000831ACS	126566		kW		0.000	0.000	8.00		N	Lat	41°	58'	45.0
W210BB	210	89.9	MHz	D	FX	LIC	BENTON HARBOR	MI	US	BLFT	-20010105ABE	78882	.170	kW	26.0		217.0		30.0	N	Lat	42°	05'	52.0
WHLP	210	89.9	MHz	B1	FM	LIC	HANNA	IN	US	BLED	-20010917AAC	91345	8.00	kW	154.154.	372.0	372.0	148.	148.	N	Lat	41°	26'	9.00
W211AQ	211	90.1	MHz	D	FX	CP	FREEPORT	IL	US	BPFT	-19960213TA	66034	.038	kW	50.0		303.0		44.0	N	Lat	42°	17'	41.0
WMBI-FM	211	90.1	MHz	B	FM	LIC	CHICAGO	IL	US	BLED	-19970613KA	66063	100.	kW	135.135.	350.0	350.0	140.	140.	N	Lat	41°	55'	41.0
W211AU	211	90.1	MHz	D	FX	LIC	MONROE	WI	US	BLFT	-19980528TJ	84900	.013	kW	105.	384.0	384.0	61.0	61.0	N	Lat	42°	34'	35.0
WBCR-FM	212	90.3	MHz	A	FM	LIC	BELOIT	WI	US	BLED	-19851108KI	65465	.130	kW	18.018.0	266.0	266.0	28.0	28.0	N	Lat	42°	30'	13.0
W212BH	212	90.3	MHz	D	FX	LIC	MICHIGAN CITY	IN	US	BLFT	-20001115ABD	92412	.086	kW	27.027.0	231.0	231.0	36.0	36.0	N	Lat	41°	40'	57.0
WJWD	212	90.3	MHz	B1	FM	CP MOD	MARSHALL	WI	US	BMPED	-20010125ACD	93445	9.90	kW	95.095.0	380.0	380.0	105.	105.	N	Lat	43°	20'	40.0
WMTH	213	90.5	MHz	D	FM	LIC	PARK RIDGE	IL	US	BLED	-19850916KI	6050	.008	kW	31.031.0	230.0	230.0	34.0	34.0	N	Lat	42°	02'	14.0
WRTE	213	90.5	MHz	D	FM	LIC	CHICAGO	IL	US	BLED	-19880209KH	10794	.008	kW	22.022.0	207.0	207.0	25.0	25.0	N	Lat	41°	50'	26.0
891019MA	213	90.5	MHz	B1	FM	APP	CROWN POINT	IN	US	BPED	-19891019MA	28188	10.0	kW	69.069.0	271.0	271.0			N	Lat	41°	27'	56.0

910409MF	213	90.5	MHz	B	FM	APP	CROWN POINT	IN	US	BPED	-19910409MF	66003	27.5	kW	161.161.	372.0	372.0	152.	152.	N Lat	41° 20' 56.0
WNIJ	213	90.5	MHz	B	FM	LIC	ROCKFORD	IL	US	BLED	-19910411KA	49545	50.0	kW	112.112.	364.0	364.0	127.	127.	N Lat	42° 00' 55.0
WRTE	213	90.5	MHz	D	FM	CP	CHICAGO	IL	US	BPED	-20000609ABC	10794	.073	kW	26.026.0	207.0	207.0	25.0	25.0	N Lat	41° 50' 26.0
WRTE	213	90.5	MHz	A	FM	APP	CHICAGO	IL	US	BPED	-20000609ABC	10794	.073	kW	26.026.0	207.0	207.0	25.0	25.0	N Lat	41° 50' 26.0
WBHI	214	90.7	MHz	D	FM	LIC	CHICAGO	IL	US	BLED	-19860207KG	6265	.007	kW	17.017.0	203.0	203.0	14.0	14.0	N Lat	41° 44' 55.0
WHAD	214	90.7	MHz	B	FM	LIC	DELAFIELD	WI	US	BMLED	-19901206KC	63091	79.0	kW	213.213.	491.0	491.0	116.	116.	N Lat	43° 01' 56.0
WAUS	214	90.7	MHz	B	FM	LIC	BERRIEN SPRINGS	MI	US	BLED	-19920424KA	2241	50.0	kW	150.150.	366.0	366.0	165.	165.	N Lat	41° 57' 42.0
980730MB	214	90.7	MHz	B1	FM	APP	MORRIS	IL	US	BPED	-19980730MB	91336	7.00	kW	82.082.0	262.0	262.0	79.0	79.0	N Lat	41° 13' 48.0
981228MA	214	90.7	MHz	A	FM	APP	MORRIS	IL	US	BPED	-19981228MA	92544	6.00	kW	98.098.0	278.0	278.0	95.0	95.0	N Lat	41° 13' 48.0
990318MD	214	90.7	MHz	A	FM	APP	MORRIS	IL	US	BPED	-19990318MD	92976	6.00	kW	56.056.0	234.0	234.0	57.0	57.0	N Lat	41° 13' 15.0
WHAD	214	90.7	MHz	B	FM	CP	DELAFIELD	WI	US	BPED	-19991103ABI	63091	72.0	kW	214.214.	493.0	493.0	133.	133.	N Lat	43° 01' 42.0
NEW	214	90.7	MHz	L1	FL	APP	LINCOLNWOOD	IL	US	BNPL	-20000901AGL	126954		kW		0.000	0.000	28.8		N Lat	42° 00' 45.0
WDCB	215	90.9	MHz	A	FM	LIC	GLEN ELLYN	IL	US	BMLED	-19840113AF	12281	5.00	kW	91.091.0	314.0	314.0	85.0	85.0	N Lat	41° 50' 36.0
W215AQ	215	90.9	MHz	D	FX	LIC	MADISON	WI	US	BLFT	-19970618TB	83023	.010	kW	169.169.	468.0	468.0	125.	125.	N Lat	43° 03' 21.0
WGTD	216	91.1	MHz	B1	FM	LIC	KENOSHA	WI	US	BLED	-19790618AH	23347	5.00	kW	41.041.0	258.0	258.0	67.0	67.0	N Lat	42° 36' 28.0
W216AC	216	91.1	MHz	D	FX	LIC	VALPARAISO	IN	US	BLFT	-19870327TK	70477	.001	kW	31.0	251.0		50.0		N Lat	41° 28' 40.0
WGSL	216	91.1	MHz	B1	FM	LIC	LOVES PARK	IL	US	BLED	-19880408KC	11064	4.00	kW	120.120.	367.0	367.0	105.	105.	N Lat	42° 19' 18.0
WTKC	216	91.1	MHz	A	FM	LIC	KANKAKEE	IL	US	BLED	-19920313KA	33327	1.75	kW	93.093.0	287.0	287.0	83.0	83.0	N Lat	41° 09' 24.0
971112MA	216	91.1	MHz	A	FM	APP	VALPARAISO	IN	US	BPED	-19971112MA	89070	.150	kW	134.134.	355.0	355.0	102.	102.	N Lat	41° 31' 25.0
WGSL	216	91.1	MHz	B1	FM	CP	LOVES PARK	IL	US	BPED	-19980424IC	11064	7.00	kW	161.161.	408.0	408.0	147.	147.	N Lat	42° 19' 20.0
980512MP	216	91.1	MHz	A	FM	APP	VALPARAISO	IN	US	BPED	-19980512MP	90651	.230	kW	125.125.	345.0	345.0	86.0	86.0	N Lat	41° 31' 22.0
980512MU	216	91.1	MHz	A	FM	APP	CHESTERTON	IN	US	BPED	-19980512MU	90708	1.40	kW	31.031.0	231.0	231.0	40.0	40.0	N Lat	41° 37' 0.00
980512MV	216	91.1	MHz	A	FM	APP	SOUTH HAVEN	IN	US	BPED	-19980512MV	90705	.150	kW	135.135.	355.0	355.0	102.	102.	N Lat	41° 31' 25.0
W216BL	216	91.1	MHz	D	FX	CP	MCFARLAND	WI	US	BPFT	-19981019TF	91912	.120	kW	30.030.0	305.0	305.0	40.0	40.0	N Lat	43° 03' 0.00
990520VD	216	91.1	MHz	D	FX	APP	BRISTOL	IL	US	BPFT	-19990520VD	93463	.034	kW	71.071.0	275.0	275.0	74.0	74.0	N Lat	41° 42' 16.0
W216BX	216	91.1	MHz	D	FX	CP MOD	BENTON HARBOR	MI	US	BMPFT	-20010206AAN	92626	.080	kW			232.0		46.0	N Lat	42° 05' 52.0
971016MC	217	91.3	MHz	A	FM	APP	RANDOM LAKE	WI	US	BPED	-19971016MC	88742	2.60	kW	129.129.	420.0	420.0	127.	127.	N Lat	43° 37' 45.0
980506MD	217	91.3	MHz	C3	FM	APP	PLYMOUTH	WI	US	BPED	-19980506MD	90610	10.0	kW	84.0		375.0		24.0	N Lat	43° 43' 32.0
980512ME	217	91.3	MHz	A	FM	APP	KIEL	WI	US	BPED	-19980512ME	90655	1.20	kW	147.147.	444.0	444.0	76.0	76.0	N Lat	43° 43' 23.0
980512MG	217	91.3	MHz	A	FM	APP	FOND DU LAC	WI	US	BPED	-19980512MG	90675	.500	kW	93.0		400.0		40.0	N Lat	43° 42' 0.00
WNIW	217	91.3	MHz	B	FM	LIC	LA SALLE	IL	US	BLED	-19981229KA	49556	36.0	kW	101.		304.0		95.0	N Lat	41° 24' 47.0
W217BJ	217	91.3	MHz	D	FX	CP MOD	FREEPORT	IL	US	BMPFT	-20010919ABE	94160	.075	kW		300.0	300.0	38.0	38.0	N Lat	42° 20' 27.0
WBEZ	218	91.5	MHz	B	FM	LIC	CHICAGO	IL	US	BLED	-19850628KL	66649	8.30	kW	360.360.	539.0	539.0	359.	359.	N Lat	41° 53' 56.0
WNIQ	218	91.5	MHz	A	FM	LIC	STERLING	IL	US	BLED	-19981112KA	49557	2.40	kW	100.100.	326.0	326.0	71.0	71.0	N Lat	41° 53' 52.0
990719MI	218	91.5	MHz	A	FM	APP	JANESVILLE	WI	US	BPED	-19990719MI	93903	2.20	kW	118.118.	392.0	392.0	122.	122.	N Lat	42° 43' 47.0
WMSE	219	91.7	MHz	A	FM	LIC	MILWAUKEE	WI	US	BLED	-19950324KB	42675	3.20	kW	40.040.0	251.0	251.0	59.0	59.0	N Lat	43° 02' 44.0
W219CD	219	91.7	MHz	D	FX	CP	ELGIN	IL	US	BPFT	-19980309TC	90195	.010	kW	145.	403.0	403.0	131.	131.	N Lat	42° 01' 11.0
980914TC	219	91.7	MHz	D	FX	APP	ELGIN	IL	US	BPFT	-19980914TC	91647	.010	kW	152.	410.0	410.0	137.	137.	N Lat	42° 01' 11.0
990316MG	219	91.7	MHz	A	FM	APP	WOODSTOCK	IL	US	BPED	-19990316MG	93014	1.00	kW	60.060.0	339.0	339.0	34.0	34.0	N Lat	42° 24' 40.0
WSUM	219	91.7	MHz	A	FM	CP MOD	MADISON	WI	US	BMPED	-19990429IB	79040	5.60	kW	103.103.	404.0	404.0	117.	117.	N Lat	42° 54' 16.0
WSUW	219	91.7	MHz	A	FM	LIC	WHITEWATER	WI	US	BLED	-1792	4284	1.30	kW	55.055.0	317.0	317.0	55.0	55.0	N Lat	42° 50' 10.0
990916MC	219	91.7	MHz	A	FM	APP	WOODSTOCK	IL	US	BPED	-19990916MC	94187	1.00	kW	14.014.0	290.0	290.0	22.0	22.0	N Lat	42° 22' 6.00
990917MI	219	91.7	MHz	A	FM	APP	WOODSTOCK	IL	US	BPED	-19990917MI	94252	2.00	kW	61.061.0	340.0	340.0	35.0	35.0	N Lat	42° 24' 40.0
990917MM	219	91.7	MHz	A	FM	APP	WOODSTOCK	IL	US	BPED	-19990917MM	94208	5.00	kW	100.		365.0		63.0	N Lat	42° 17' 37.0
WSHS	219	91.7	MHz	A	FM	LIC	SHEBOYGAN	WI	US	BLED	-20000515AAH	60041	.175	kW	26.0		225.0		33.0	N Lat	43° 46' 32.0
WJCH	220	91.9	MHz	B	FM	LIC	JOLIET	IL	US	BLED	-19860505KF	20847	50.0	kW	151.151.	319.0	319.0	131.	131.	N Lat	41° 24' 55.0
W220BL	220	91.9	MHz	D	FX	LIC	ROCKFORD	IL	US	BLFT	-19980123TD	78668	.050	kW	45.0		285.0		30.0	N Lat	42° 22' 2.00
981224MA	220	91.9	MHz	A	FM	APP	JANESVILLE	WI	US	BPED	-19981224MA	92545	1.60	kW	103.103.	371.0	371.0	61.0	61.0	N Lat	42° 42' 31.0
W220BL	220	91.9	MHz	D	FX	LIC	ROCKFORD	IL	US	BLFT	-19990504UA	78668	.050	kW	45.0		285.0		30.0	N Lat	42° 22' 2.00
WGHN-FM	221	92.1	MHz	A	FM	LIC	GRAND HAVEN	MI	US	BLH	-19861110KA	72105	3.00	kW	75.075.0	261.0	261.0	42.0	42.0	N Lat	43° 03' 23.0
WDOW-FM	221	92.1	MHz	A	FM	LIC	DOWAGIAC	MI	US	BMLH	-19911112KA	69804	3.30	kW	91.091.0	342.0	342.0	61.0	61.0	N Lat	41° 59' 52.0
WEZY	221	92.1	MHz	A	FM	LIC	RACINE	WI	US	BLH	-19931025KB	41438	2.70	kW	150.150.	373.0	373.0	149.	149.	N Lat	42° 45' 36.0
WEZY	221	92.1	MHz	A	FS	LIC	RACINE	WI	US	BMLH	-19960506KD	41438	.550		82.082.0	285.0	285.0	67.0	67.0	N Lat	42° 40' 55.0
WMAD-FM	221	92.1	MHz	A	FM	CP	SUN PRAIRIE	WI	US	BPH	-19970508IB	17383	3.90	kW	125.125.	405.0	405.0	110.	110.	N Lat	43° 10' 25.0
--	221	92.1	MHz	A	FA	USED	FREEPORT	IL	US			22647								N Lat	42° 19' 41.0
--	221	92.1	MHz	A	FA	USED	DOWAGIAC	MI	US			69804								N Lat	41° 59' 52.0
--	221	92.1	MHz	A	FA	USED	GRAND HAVEN	MI	US			72105								N Lat	43° 03' 23.0
--	221	92.1	MHz	A	FA	USED	RACINE	WI	US			41438								N Lat	42° 40' 55.0

--	221	92.1	MHz	A	FA	USED	SUN PRAIRIE	WI	US			17383								N	Lat	43°	10'	25.0
WMAD-FM	221	92.1	MHz	A	FM	LIC	SUN PRAIRIE	WI	US	BLH	-19790530AM	17383	1.75	kW	122.122.	405.0	405.0	109.	109.	N	Lat	43°	10'	25.0
WFPS-FM	221	92.1	MHz	A	FM	LIC	FREEPORT	IL	US	BLH	-20001219ABH	22647	3.60	kW	129.129.	387.0	387.0	116.	116.	N	Lat	42°	19'	41.0
WPWX	222	92.3	MHz	B	FM	LIC	HAMMOND	IN	US	BLH	-19861103KD	17304	50.0	kW	150.150.	333.0	333.0	154.	154.	N	Lat	41°	37'	50.0
--	222	92.3	MHz	B	FA	USED	HAMMOND	IN	US			17304								N	Lat	41°	37'	50.0
WDEK	223	92.5	MHz	B	FM	LIC	DEKALB	IL	US	BLH	-19800929AC	15974	20.0	kW	149.149.	412.0	412.0	143.	143.	N	Lat	41°	52'	33.0
WBWI-FM	223	92.5	MHz	B	FM	LIC	WEST BEND	WI	US	BLH	-19950601KA	71542	17.5	kW	164.164.	474.0	474.0	121.	121.	N	Lat	43°	25'	46.0
--	223	92.5	MHz	B	FA	USED	DEKALB	IL	US			94880								N	Lat	41°	52'	33.0
--	223	92.5	MHz	B	FA	USED	WEST BEND	WI	US			71542								N	Lat	43°	25'	45.0
WKIF	224	92.7	MHz	A	FM	LIC	KANKAKEE	IL	US	BLH	-19861007KB	62360	3.00	kW	100.100.	295.0	295.0	102.	102.	N	Lat	41°	07'	22.0
WYVN	224	92.7	MHz	A	FM	LIC	SAUGATUCK	MI	US	BLH	-19870715KC	13676	2.15	kW	118.118.	311.0	311.0	104.	104.	N	Lat	42°	41'	10.0
--	224	92.7	MHz	A	FA	USED	ARLINGTON HEIGHTS	IL	US			15520								N	Lat	42°	07'	50.0
--	224	92.7	MHz	A	FA	USED	KANKAKEE	IL	US			62360								N	Lat	41°	07'	22.0
--	224	92.7	MHz	A	FA	USED	SAUGATUCK	MI	US			13676								N	Lat	42°	41'	10.0
WKIE	224	92.7	MHz	A	FM	LIC	ARLINGTON HEIGHTS	IL	US	BLH	-20000211ABB	15520	1.80	kW	116.116.	334.0	334.0	118.	118.	N	Lat	42°	08'	14.0
NEW	224	92.7	MHz	L1	FL	APP	MADISON	WI	US	BNPL	-20010122ACS	132252		kW		0.000	0.000	10.0		N	Lat	42°	46'	48.0
NEW	225	92.9	MHz	L1	FL	APP	MUKWONAGO	WI	US	BNPL	-20010116ABT	131376		kW		0.000	0.000	29.0		N	Lat	42°	46'	8.00
NEW	225	92.9	MHz	L1	FL	APP	MILTON	WI	US	BNPL	-20010122ABA	132181		kW		0.000	0.000	15.0		N	Lat	42°	46'	22.0
NEW	225	92.9	MHz	L1	FL	APP	JANESVILLE	WI	US	BNPL	-20010122AFX	132256		kW		0.000	0.000	36.7		N	Lat	42°	39'	35.0
NEW	225	92.9	MHz	L1	FL	APP	WHITEWATER	WI	US	BNPL	-20010122AES	132269		kW		0.000	0.000	45.1		N	Lat	42°	50'	18.0
NEW	225	92.9	MHz	L1	FL	APP	MILTON	WI	US	BNPL	-20010122ADM	132295		kW		0.000	0.000	14.0		N	Lat	42°	44'	34.0
NEW	225	92.9	MHz	L1	FL	APP	ELKHORN	WI	US	BNPL	-20010122AGB	132347		kW	144.	320.3	0.000	17.1		N	Lat	42°	39'	53.0
NEW	225	92.9	MHz	L1	FL	APP	BELOIT	WI	US	BNPL	-20010122AIT	132407		kW		0.000	0.000	45.0		N	Lat	42°	27'	34.0
WXRT-FM	226	93.1	MHz	B	FM	LIC	CHICAGO	IL	US	BLH	-19810930AF	16853	6.70	kW	399.399.	579.0	579.0	398.	398.	N	Lat	41°	53'	56.0
951006MK	226	93.1	MHz	A	FM	CP	DE FOREST	WI	US	BPH	-19951006MK	78226	6.00	kW	100.100.	379.0	379.0	99.0	99.0	N	Lat	43°	10'	4.00
--	226	93.1	MHz	B	FA	USED	CHICAGO	IL	US			16853								N	Lat	41°	53'	56.0
--	226	93.1	MHz	A	FA	USED	DE FOREST	WI	US	Dkt	93-91	78164								N	Lat	43°	16'	8.00
NEW	226	93.1	MHz	L1	FL	APP	HOLLAND	MI	US	BNPL	-20000901ACB	126625		kW		0.000	0.000	39.0		N	Lat	42°	47'	16.0
NEW	226	93.1	MHz	L1	FL	APP	ROCKFORD	IL	US	BNPL	-20000901AGW	126983		kW		0.000	0.000	27.0		N	Lat	42°	15'	23.0
WJZI	227	93.3	MHz	B	FM	LIC	MILWAUKEE	WI	US	BLH	-19840515CB	59974	12.5	kW	302.302.	512.0	512.0	311.	311.	N	Lat	43°	05'	15.0
W227AG	227	93.3	MHz	D	FX	CP MOD	DE KALB	IL	US	BMPFT	-19970129TA	13937	.170	kW	28.028.0	291.0	291.0	24.0	24.0	N	Lat	41°	55'	44.0
--	227	93.3	MHz	B	FA	USED	MILWAUKEE	WI	US			59974								N	Lat	43°	05'	15.0
WJTW	228	93.5	MHz	A	FM	LIC	JOLIET	IL	US	BLH	-19980925KC	48449	3.00	kW	84.084.0	278.0	278.0	101.	101.	N	Lat	41°	32'	6.00
--	228	93.5	MHz	A	FA	USED	JOLIET	IL	US			48449								N	Lat	41°	32'	18.0
WITW-LP	228	93.5	MHz	L1	FL	CP	VALPARAISO	IN	US	BNPL	-20000605AHR	124357		kW	34.7	262.0	0.000	30.0		N	Lat	41°	28'	7.00
NEW	228	93.5	MHz	L1	FL	APP	NEW BUFFALO	MI	US	BNPL	-20000830AAW	125892		kW		0.000	0.000	15.0		N	Lat	41°	47'	30.0
NEW	228	93.5	MHz	L1	FL	APP	NEW BUFFALO	MI	US	BNPL	-20000830ABQ	126305		kW		0.000	0.000	27.0		N	Lat	41°	47'	40.0
NEW	228	93.5	MHz	L1	FL	APP	NEW BUFFALO	MI	US	BNPL	-20000830ABO	126314		kW	7.03	198.0	0.000	15.0		N	Lat	41°	47'	48.0
NEW	228	93.5	MHz	L1	FL	APP	NEW BUFFALO	MI	US	BNPL	-20000830ABR	126327		kW		0.000	0.000	15.0		N	Lat	41°	47'	38.0
NEW	228	93.5	MHz	L1	FL	APP	NEW BUFFALO	MI	US	BNPL	-20000830ABS	126330		kW		0.000	0.000	15.0		N	Lat	41°	47'	5.00
NEW	228	93.5	MHz	L1	FL	APP	NILES	MI	US	BNPL	-20000901AHW	127122		kW		0.000	0.000	218.		N	Lat	41°	49'	42.0
WEKZ-FM	229	93.7	MHz	B	FM	LIC	MONROE	WI	US	BLH	-19820809AH	25132	36.0	kW	177.177.	454.0	454.0	131.	131.	N	Lat	42°	34'	35.0
WBFM	229	93.7	MHz	A	FM	LIC	SHEBOYGAN	WI	US	BLH	-19930225KB	9968	6.00	kW	77.077.0	277.0	277.0	83.0	83.0	N	Lat	43°	43'	12.0
--	229	93.7	MHz	B	FA	USED	MONROE	WI	US			25132								N	Lat	42°	34'	35.0
--	229	93.7	MHz	A	FA	USED	SHEBOYGAN	WI	US			9968								N	Lat	43°	43'	12.0
--	230	93.9	MHz	B	FA	USED	CHICAGO	IL	US			70042								N	Lat	41°	52'	44.0
WLIT-FM	230	93.9	MHz	B	FM	LIC	CHICAGO	IL	US	BLH	-20000119ABJ	70042	4.00	kW	482.482.	663.0	663.0	482.	482.	N	Lat	41°	52'	44.0
WJJO	231	94.1	MHz	B	FM	LIC	WATERTOWN	WI	US	BLH	-19890906KC	73142	50.0	kW	150.150.	416.0	416.0	149.	149.	N	Lat	43°	03'	32.0
--	231	94.1	MHz	B	FA	USED	WATERTOWN	WI	US			73142								N	Lat	43°	03'	32.0
WJKL	232	94.3	MHz	A	FM	LIC	ELGIN	IL	US	BLH	-19990730KC	19221	6.00	kW	100.100.	341.0	341.0	106.	106.	N	Lat	41°	59'	54.0
--	232	94.3	MHz	A	FA	USED	ELGIN	IL	US			19221								N	Lat	41°	59'	54.0
W233AD	233	94.5	MHz	D	FX	LIC	ROCKFORD	IL	US	BLFT	-19950302TD	20742	.038	kW	73.0		299.0			N	Lat	42°	16'	2.00
WKTI-FM	233	94.5	MHz	B	FS	CP	MILWAUKEE	WI	US	BPH	-19990217ID	74095	15.5		230.230.	437.0	437.0	243.	243.	N	Lat	43°	05'	29.0
--	233	94.5	MHz	B	FA	USED	MILWAUKEE	WI	US			74095								N	Lat	43°	05'	29.0
WKTI-FM	233	94.5	MHz	B	FM	LIC	MILWAUKEE	WI	US	BLH	-19991020ABM	74095	14.0	kW	291.291.	498.0	498.0	304.	304.	N	Lat	43°	05'	29.0
--	234	94.7	MHz	B	FA	USED	CHICAGO	IL	US			73228								N	Lat	41°	52'	44.0
WZZN	234	94.7	MHz	B	FM	LIC	CHICAGO	IL	US	BLH	-20001027ABQ	73228	4.40	kW	468.468.	649.0	649.0	468.	468.	N	Lat	41°	52'	44.0
WDKB	235	94.9	MHz	A	FM	LIC	DEKALB	IL	US	BLH	-19980109KC	16408	3.00	kW	100.100.	361.0	361.0	87.0	87.0	N	Lat	41°	56'	57.0

W235AG	235	94.9	MHz	D	FX	LIC	SHEBOYGAN	WI	US	BLFT	-19980706TA	86541	.018	kW	95.0	294.0	294.0	70.0	70.0	N Lat 43° 45' 16.0
WCNF	235	94.9	MHz	A	FM	LIC	BENTON HARBOR	MI	US	BLH	-19980925KD	74006	2.20	kW	116.116.	318.0	318.0	96.0	96.0	N Lat 42° 04' 19.0
--	235	94.9	MHz	A	FA	USED	DEKALB	IL	US	Dkt	86-134	16408								N Lat 41° 56' 35.0
--	235	94.9	MHz	A	FA	USED	BENTON HARBOR	MI	US	Dkt	84-231	2242								N Lat 42° 04' 19.0
WVUR-FM	236	95.1	MHz	D	FM	LIC	VALPARAISO	IN	US	BLED	-19820920AL	69776	.036	kW	38.0	262.0		22.0		N Lat 41° 27' 57.0
WIIL	236	95.1	MHz	B	FM	LIC	KENOSHA	WI	US	BLH	-19851125KB	28473	50.0	kW	117.117.	326.0	326.0	117.	117.	N Lat 42° 33' 10.0
WVLI	236	95.1	MHz	A	FM	LIC	KANKAKEE	IL	US	BLH	-19990311KA	42656	2.30	kW	112.112.	304.0	304.0	116.	116.	N Lat 41° 04' 39.0
--	236	95.1	MHz	B	FA	USED	KENOSHA	WI	US			28473								N Lat 42° 33' 10.0
--	236	95.1	MHz	A	FA	USED	KANKAKEE	IL	US	Dkt	84-231	2239								N Lat 41° 05' 17.0
NEW	236	95.1	MHz	L1	FL	APP	HOLLAND	MI	US	BNPL	-20000831AAQ	126268		kW		0.000	0.000	30.0		N Lat 42° 47' 9.00
NEW	236	95.1	MHz	L1	FL	APP	16240 QUINCY ST.	MI	US	BNPL	-20000901ABS	126651		kW		0.000	0.000	37.0		N Lat 42° 50' 27.0
NEW	236	95.1	MHz	L1	FL	APP	HOLLAND	MI	US	BNPL	-20000831ADU	126830		kW		0.000	0.000	12.0		N Lat 42° 47' 27.0
WYHY	237	95.3	MHz	A	FM	LIC	WINNEBAGO	IL	US	BLH	-19850108LQ	59620	1.25	kW	156.156.	400.0	400.0	157.	157.	N Lat 42° 17' 26.0
WAOR	237	95.3	MHz	A	FM	LIC	NILES	MI	US	BMLH	-19910606KB	48911	3.30	kW	91.091.0	322.0	322.0	98.0	98.0	N Lat 41° 49' 22.0
WXRO	237	95.3	MHz	A	FM	LIC	BEAVER DAM	WI	US	BLH	-19911024KA	4474	6.00	kW	100.100.	373.0	373.0	92.0	92.0	N Lat 43° 28' 9.00
WRKX	237	95.3	MHz	A	FM	LIC	OTTAWA	IL	US	BLH	-19970422KE	70304	4.30	kW	61.061.0	246.0	246.0	56.0	56.0	N Lat 41° 23' 0.00
--	237	95.3	MHz	A	FA	USED	OTTAWA	IL	US			70304								N Lat 41° 23' 3.00
--	237	95.3	MHz	A	FA	USED	WINNEBAGO	IL	US			59620								N Lat 42° 17' 26.0
--	237	95.3	MHz	A	FA	USED	NILES	MI	US			48911								N Lat 41° 49' 22.0
--	237	95.3	MHz	A	FA	USED	BEAVER DAM	WI	US			4474								N Lat 43° 28' 8.00
NEW	237	95.3	MHz	L1	FL	APP	PLYMOUTH	WI	US	BNPL	-20010122AKL	132441		kW		0.000	0.000	49.0		N Lat 43° 44' 33.0
WNUA	238	95.5	MHz	B	FM	LIC	CHICAGO	IL	US	BLH	-19881011KC	53971	8.30	kW	358.358.	538.0	538.0	357.	357.	N Lat 41° 53' 56.0
--	238	95.5	MHz	B	FA	USED	CHICAGO	IL	US			53971								N Lat 41° 53' 56.0
WNUA	238	95.5	MHz	B	FS	CP	CHICAGO	IL	US	BXPH	-20010427AAF	53971	5.60		425.425.	606.0	606.0	425.	425.	N Lat 41° 53' 56.0
WJDK-FM	239	95.7	MHz	A	FM	LIC	SENECA	IL	US	BLH	-19971204KD	40728	3.00	kW	100.100.	294.0	294.0	97.0	97.0	N Lat 41° 13' 12.0
WSEY	239	95.7	MHz	A	FM	LIC	OREGON	IL	US	BLH	-19990809KB	1641	3.20	kW	109.109.	355.0	355.0	91.0	91.0	N Lat 42° 04' 19.0
--	239	95.7	MHz	A	FR	ADD	OREGON	IL	US	Dkt	99-64									N Lat 41° 59' 4.00
--	239	95.7	MHz	A	FA	USED	SENECA	IL	US			40728								N Lat 41° 14' 47.0
--	239	95.7	MHz	B	FA	USED	MILWAUKEE	WI	US			60233								N Lat 43° 05' 25.0
WRIT-FM	239	95.7	MHz	B	FM	LIC	MILWAUKEE	WI	US	BLH	-7581	60233	34.0	kW	186.186.	387.0	387.0	193.	193.	N Lat 43° 05' 25.0
--	239	95.7	MHz	A	FA	USED	MOUNT MORRIS	IL	US	Dkt	88-369	1641								N Lat 42° 04' 14.0
--	239	95.7	MHz	A	FR	DEL	MT. MORRIS	IL	US	Dkt	99-64									N Lat 41° 59' 4.00
--	239	95.7	MHz	A	FA	VACANT	OREGON	IL	US	Dkt	99-64	106499								N Lat 41° 59' 4.00
WRIT-FM	239	95.7	MHz	B	FM	CP	MILWAUKEE	WI	US	BPH	-20000606ACI	60233	34.0	kW	186.186.	399.0	399.0	193.	193.	N Lat 43° 05' 24.0
--	240	95.9	MHz	A	FA	USED	AURORA	IL	US			73171								N Lat 41° 46' 12.0
--	240	95.9	MHz	A	FA	USED	MICHIGAN CITY	IN	US			41677								N Lat 41° 42' 58.0
WEFM	240	95.9	MHz	A	FM	LIC	MICHIGAN CITY	IN	US	BLH	-7669	41677	3.00	kW	70.070.0	277.0	277.0	91.0	91.0	N Lat 41° 42' 58.0
NEW	240	95.9	MHz	L1	FL	APP	MONROE	WI	US	BNPL	-20010116ABK	131579		kW	73.9	361.0	0.000	20.0		N Lat 42° 38' 48.0
WERV-FM	240	95.9	MHz	A	FS	LIC	AURORA	IL	US	BXMLH	-20010314AAG	73171	3.00		91.091.0	307.0	307.0	93.0	93.0	N Lat 41° 46' 9.00
WERV-FM	240	95.9	MHz	A	FM	LIC	AURORA	IL	US	BMLH	-20010314AAF	73171	2.85	kW	103.103.	318.0	318.0	105.	105.	N Lat 41° 46' 9.00
WLKG	241	96.1	MHz	A	FM	LIC	LAKE GENEVA	WI	US	BLH	-19940527KC	67290	6.00	kW	100.100.	381.0	381.0	85.0	85.0	N Lat 42° 36' 34.0
--	241	96.1	MHz	A	FA	USED	LAKE GENEVA	WI	US	Dkt	89-129	15573								N Lat 42° 36' 50.0
WBBM-FM	242	96.3	MHz	B	FM	LIC	CHICAGO	IL	US	BLH	-19891019KA	9613	4.20	kW	474.474.	655.0	655.0	474.	474.	N Lat 41° 52' 44.0
--	242	96.3	MHz	B	FA	USED	CHICAGO	IL	US			9613								N Lat 41° 52' 44.0
WKLH	243	96.5	MHz	B	FM	LIC	MILWAUKEE	WI	US	BLH	-19820914AI	36370	20.0	kW	247.247.	455.0	455.0	263.	263.	N Lat 43° 05' 48.0
WKOT	243	96.5	MHz	A	FM	LIC	MARSEILLES	IL	US	BLH	-19920316KE	3958	3.00	kW	100.100.	282.0	282.0	96.0	96.0	N Lat 41° 18' 35.0
WKOT	243	96.5	MHz	A	FM	LIC	MARSEILLES	IL	US	BLH	-19990608KC	3958	2.50	kW	100.100.	282.0	282.0	96.0	96.0	N Lat 41° 18' 33.0
--	243	96.5	MHz	A	FA	USED	MARSEILLES	IL	US	Dkt	84-231	3958								N Lat 41° 18' 38.0
--	243	96.5	MHz	B	FA	USED	MILWAUKEE	WI	US			36370								N Lat 43° 05' 48.0
WKMQ-FM	244	96.7	MHz	A	FM	LIC	LOVES PARK	IL	US	BLH	-19980604KE	38638	5.00	kW	49.049.0	290.0	290.0	58.0	58.0	N Lat 42° 19' 48.0
WLLI-FM	244	96.7	MHz	A	FM	LIC	JOLIET	IL	US	BMLH	-19990203KC	62240	3.50	kW	84.084.0	278.0	278.0	101.	101.	N Lat 41° 32' 6.00
--	244	96.7	MHz	A	FA	USED	JOLIET	IL	US			62240								N Lat 41° 32' 10.0
--	244	96.7	MHz	A	FA	USED	LOVES PARK	IL	US			38638								N Lat 42° 19' 48.0
--	244	96.7	MHz	A	FA	USED	LA PORTE	IN	US			36541								N Lat 41° 37' 55.0
WCOE	244	96.7	MHz	A	FM	LIC	LA PORTE	IN	US	BLH	-2496	36541	3.00	kW	81.0	309.0		55.0		N Lat 41° 37' 55.0
NEW	244	96.7	MHz	L1	FL	APP	COLUMBUS	WI	US	BNPL	-20010122AND	132511		kW		0.000	0.000	17.0		N Lat 43° 21' 55.0
WKMQ-FM	244	96.7	MHz	A	FM	APP	LOVES PARK	IL	US	BPH	-20010928ABI	38638	2.20	kW	168.168.	404.0	404.0	136.	136.	N Lat 42° 21' 48.0
WTNX	245	96.9	MHz	B	FM	LIC	ZION	IL	US	BLH	-19870127KB	49547	50.0	kW	148.148.	360.0	360.0	137.	137.	N Lat 42° 30' 36.0

--	245	96.9	MHz	B	FA	USED	ZION	IL	US			49547								N Lat 42° 30' 36.0
WDRV	246	97.1	MHz	B	FM	LIC	CHICAGO	IL	US	BLH	-19840515CP	49552	8.40	kW	363.363.	541.0	541.0	361.	361.	N Lat 41° 53' 8.00
--	246	97.1	MHz	B	FA	USED	CHICAGO	IL	US			49552								N Lat 41° 53' 8.00
NEW	246	97.1	MHz	L1	FL	APP	NILES	MI	US	BNPL	-20000829ACH	126083		kW		0.000	0.000	29.0		N Lat 41° 48' 15.0
NEW	246	97.1	MHz	L1	FL	APP	MADISON	WI	US	BNPL	-20010122AKB	132239		kW		0.000	0.000	21.0		N Lat 43° 04' 22.0
NEW	246	97.1	MHz	L1	FL	APP	SUN PRAIRIE	WI	US	BNPL	-20010122AKY	132460		kW		0.000	0.000	18.0		N Lat 43° 10' 10.0
WDRV	246	97.1	MHz	B	FM	APP	CHICAGO	IL	US	BPH	-20010702AAQ	49552	7.90	kW	370.370.	549.0	549.0	369.	369.	N Lat 41° 53' 6.00
WLTQ	247	97.3	MHz	B	FM	LIC	MILWAUKEE	WI	US	BLH	-19840925DP	26609	15.5	kW	278.278.	491.0	491.0	302.	302.	N Lat 43° 06' 41.0
970827TC	247	97.3	MHz	D	FX	APP	MADISON	WI	US	BPFT	-19970827TC	88254	.010	kW	114.114.	408.0	408.0	84.0	84.0	N Lat 43° 03' 9.00
--	247	97.3	MHz	B	FA	USED	MILWAUKEE	WI	US			26609								N Lat 43° 06' 41.0
WZOK	248	97.5	MHz	B	FM	LIC	ROCKFORD	IL	US	BLH	-19851008KC	48986	50.0	kW	131.131.	373.0	373.0	123.	123.	N Lat 42° 16' 50.0
WYTZ	248	97.5	MHz	A	FM	LIC	BRIDGMAN	MI	US	BLH	-19930402KB	17734	3.80	kW	126.126.	316.0	316.0	124.	124.	N Lat 41° 59' 19.0
--	248	97.5	MHz	A	FA	USED	BRIDGMAN	MI	US	Dkt	88-612	17734								N Lat 41° 56' 36.0
--	248	97.5	MHz	B	FA	USED	ROCKFORD	IL	US			48986								N Lat 42° 16' 50.0
NEW	248	97.5	MHz	L1	FL	APP	CHICAGO	IL	US	BNPL	-20000831AAB	126280		kW		0.000	0.000	8.00		N Lat 41° 46' 37.3
WFDL	249	97.7	MHz	A	FM	LIC	LOMIRA	WI	US	BLH	-19930503KD	69779	4.00	kW	122.122.	421.0	421.0	83.0	83.0	N Lat 43° 39' 14.0
--	249	97.7	MHz	A	FA	USED	STREATOR	IL	US			63534								N Lat 41° 10' 49.0
--	249	97.7	MHz	C3	FA	USED	LOMIRA	WI	US			69779								N Lat 43° 42' 32.0
WSTQ	249	97.7	MHz	A	FM	LIC	STREATOR	IL	US	BMLH	-20000927ABY	63534	6.00	kW	100.100.	294.0	294.0	97.0	97.0	N Lat 41° 10' 49.0
WFDL	249	97.7	MHz	C3	FM	CP MOD	LOMIRA	WI	US	BMPH	-20010514AAM	69779	17.5	kW	122.122.	421.0	421.0	83.0	83.0	N Lat 43° 39' 14.0
WLUP-FM	250	97.9	MHz	B	FM	LIC	CHICAGO	IL	US	BMLH	-19891106KC	73233	6.00	kW	357.357.	538.0	538.0	358.	358.	N Lat 41° 53' 56.0
--	250	97.9	MHz	B	FA	USED	CHICAGO	IL	US			73233								N Lat 41° 53' 56.0
WLUP-FM	250	97.9	MHz	B	FM	CP	CHICAGO	IL	US	BPH	-20000614ABP	73233	4.00	kW	425.425.	606.0	606.0	425.	425.	N Lat 41° 53' 56.0
WMGN	251	98.1	MHz	B	FM	LIC	MADISON	WI	US	BLH	-19830502AE	41900	38.0	kW	177.177.	459.0	459.0	145.	145.	N Lat 42° 57' 46.0
--	251	98.1	MHz	B	FA	USED	MADISON	WI	US			41900								N Lat 42° 57' 46.0
WSBL-LP	251	98.1	MHz	L1	FL	CP	SOUTH BEND	IN	US	BNPL	-20000605AHM	124343		kW	12.5	242.6	0.000	24.7		N Lat 41° 40' 24.0
WCSY-FM	252	98.3	MHz	A	FM	LIC	SOUTH HAVEN	MI	US	BLH	-19920828KA	14012	1.90	kW	123.123.	324.0	324.0	108.	108.	N Lat 42° 18' 2.00
971024TF	252	98.3	MHz	D	FX	APP	KINGSBURY	IN	US	BPFT	-19971024TF	89021	.038	kW	63.0		287.0		61.0	N Lat 41° 31' 28.0
--	252	98.3	MHz	A	FA	USED	CREST HILL	IL	US			10677								N Lat 41° 27' 55.0
--	252	98.3	MHz	A	FA	USED	SOUTH HAVEN	MI	US			14012								N Lat 42° 18' 2.00
--	252	98.3	MHz	A	FA	USED	MENOMONEE FALLS	WI	US			26222								N Lat 43° 09' 0.00
WCCQ	252	98.3	MHz	A	FM	LIC	CREST HILL	IL	US	BLH	-20000301ABY	10677	3.00	kW	143.143.	317.0	317.0	143.	143.	N Lat 41° 26' 9.00
WVLP-LP	252	98.3	MHz	L1	FL	CP	VALPARAISO	IN	US	BNPL	-20000602ACG	123821		kW	19.2	245.0	0.000	26.0		N Lat 41° 27' 31.0
NEW	252	98.3	MHz	L1	FL	CP	MCHENRY	IL	US	BNPL	-20000901AFR	126912		kW	2.75	248.0	0.000	14.0		N Lat 42° 20' 46.0
WJMR-FM	252	98.3	MHz	A	FM	LIC	MENOMONEE FALLS	WI	US	BLH	-20001213ACF	26222	4.90	kW	111.111.	330.0	330.0	116.	116.	N Lat 43° 02' 49.0
WXXQ	253	98.5	MHz	B1	FM	LIC	FREEPORT	IL	US	BLH	-19990125KF	63137	11.0	kW	150.150.	395.0	395.0	116.	116.	N Lat 42° 16' 48.0
--	253	98.5	MHz	B	FA	USED	FREEPORT	IL	US			63137								N Lat 42° 18' 45.0
WMDC	254	98.7	MHz	A	FM	LIC	MAYVILLE	WI	US	BLH	-19981026KF	46698	6.00	kW	100.100.	393.0	393.0	39.0	39.0	N Lat 43° 26' 17.0
--	254	98.7	MHz	B	FA	USED	CHICAGO	IL	US			10801								N Lat 41° 53' 56.0
--	254	98.7	MHz	A	FA	USED	MAYVILLE	WI	US	Dkt	88-270	46698								N Lat 43° 30' 17.0
WFMT	254	98.7	MHz	B	FM	CP	CHICAGO	IL	US	BXPH	-20000303ACJ	10801	6.00	kW	451.451.	632.0	632.0	451.	451.	N Lat 41° 52' 44.0
WFMT	254	98.7	MHz	B	FM	LIC	CHICAGO	IL	US	BLH	-20010515AAK	10801	6.00	kW	470.470.	651.0	651.0	470.	470.	N Lat 41° 52' 44.0
W255AC	255	98.9	MHz	D	FX	LIC	SHEBOYGAN	WI	US	BLFT	-19960124TC	20618	.038	kW	57.057.0	262.0	262.0	49.0	49.0	N Lat 43° 45' 55.0
WLDC	255	98.9	MHz	A	FM	LIC	DWIGHT	IL	US	BLH	-19980901KE	19211	1.30	kW	149.149.	352.0	352.0	148.	148.	N Lat 41° 02' 6.00
WMYX-FM	256	99.1	MHz	B	FM	LIC	MILWAUKEE	WI	US	BMLH	-19860225KC	27029	50.0	kW	137.137.	377.0	377.0	133.	133.	N Lat 42° 56' 44.0
WSMK	256	99.1	MHz	A	FM	LIC	BUCHANAN	MI	US	BLH	-19910821KN	40167	3.00	kW	100.100.	323.0	323.0	94.0	94.0	N Lat 41° 52' 51.0
--	256	99.1	MHz	A	FA	USED	BUCHANAN	MI	US	Dkt	84-231	17733								N Lat 41° 52' 51.0
--	256	99.1	MHz	B	FA	USED	MILWAUKEE	WI	US			27029								N Lat 42° 56' 44.0
NEW	256	99.1	MHz	L1	FL	APP	MADISON	WI	US	BNPL	-20010122ALN	131397		kW		0.000	0.000	11.3		N Lat 43° 03' 39.0
NEW	256	99.1	MHz	L1	FL	APP	MADISON	WI	US	BNPL	-20010122AHZ	131553		kW		0.000	0.000	15.5		N Lat 43° 04' 4.00
NEW	256	99.1	MHz	L1	FL	APP	MADISON	WI	US	BNPL	-20010122AIM	131789		kW		0.000	0.000	29.5		N Lat 43° 04' 44.0
NEW	256	99.1	MHz	L1	FL	APP	MADISON	WI	US	BNPL	-20010122ABH	132183		kW		0.000	0.000	15.5		N Lat 43° 04' 4.00
NEW	256	99.1	MHz	L1	FL	APP	MADISON	WI	US	BNPL	-20010122AFW	132341		kW		0.000	0.000	15.5		N Lat 43° 04' 4.00
NEW	256	99.1	MHz	L1	FL	APP	MADISON	WI	US	BNPL	-20010122AME	132458		kW		0.000	0.000	9.00		N Lat 43° 03' 39.0
NEW	256	99.1	MHz	L1	FL	APP	MADISON	WI	US	BNPL	-20010122AMC	132485		kW		0.000	0.000	10.0		N Lat 43° 03' 39.0
NEW	256	99.1	MHz	L1	FL	APP	MADISON	WI	US	BNPL	-20010122AMN	132499		kW		0.000	0.000	10.0		N Lat 43° 03' 39.0
NEW	256	99.1	MHz	L1	FL	APP	MADISON	WI	US	BNPL	-20010122ANB	132508		kW		0.000	0.000	10.0		N Lat 43° 03' 39.0
WAJK	257	99.3	MHz	B1	FM	LIC	LA SALLE	IL	US	BLH	-19891026KC	36181	11.0	kW	149.149.	352.0	352.0	143.	143.	N Lat 41° 24' 47.0

--	257	99.3	MHz	B1	FA	USED	LA SALLE	IL	US	Dkt	87-231	36181								N Lat 41° 22' 29.0
NEW	257	99.3	MHz	L1	FL	APP	CHICAGO	IL	US	BNPL	-20000828ADH	126003		kW		0.000	0.000	10.0		N Lat 41° 42' 50.0
WUSN	258	99.5	MHz	B	FM	LIC	CHICAGO	IL	US	BLH	-19891214KB	28620	8.30	kW	358.358.	538.0	538.0	357.	357.	N Lat 41° 53' 56.0
--	258	99.5	MHz	B	FA	USED	CHICAGO	IL	US			28620								N Lat 41° 53' 56.0
--	258	99.5	MHz	A	FA	VACANT	CEDARVILLE	IL	US	Dkt	97-67	96242								N Lat 42° 21' 50.0
WUSN	258	99.5	MHz	B	FM	CP	CHICAGO	IL	US	BPH	-20000620AEM	28620	5.70	kW	425.425.	606.0	606.0	425.	425.	N Lat 41° 53' 56.0
WJVL	260	99.9	MHz	B1	FM	LIC	JANESVILLE	WI	US	BLH	-19891018KB	61391	11.0	kW	153.153.	427.0	427.0	157.	157.	N Lat 42° 43' 47.0
WHFB-FM	260	99.9	MHz	B	FM	LIC	BENTON HARBOR	MI	US	BLH	-19990210KC	72175	50.0	kW	124.124.	337.0	337.0	136.	136.	N Lat 41° 57' 42.0
WJVL	260	99.9	MHz	B1	FS	APP	JANESVILLE	WI	US	BPH	-19990804IH	61391	9.00		66.0	326.0		70.0		N Lat 42° 39' 35.0
--	260	99.9	MHz	B	FA	USED	KANKAKEE	IL	US			23476								N Lat 41° 18' 4.00
--	260	99.9	MHz	B	FA	USED	BENTON HARBOR	MI	US			72175								N Lat 42° 03' 17.0
--	260	99.9	MHz	B1	FA	USED	JANESVILLE	WI	US			61391								N Lat 42° 43' 47.0
--	260	99.9	MHz	B	FR	DEL	KANKAKEE	IL	US											N Lat 41° 18' 4.00
--	260	99.9	MHz	B	FA	RSV	PARK FOREST	IL	US											N Lat 41° 18' 4.000"
NEW	260	99.9	MHz	L1	FL	APP	RACINE	WI	US	BNPL	-20010122AGX	132249		kW		0.000	0.000	24.6		N Lat 42° 42' 38.0
NEW	260	99.9	MHz	L1	FL	APP	RACINE	WI	US	BNPL	-20010122AGC	132297		kW		0.000	0.000	29.0		N Lat 42° 41' 50.0
NEW	260	99.9	MHz	L1	FL	APP	RACINE	WI	US	BNPL	-20010122AMQ	132486		kW		0.000	0.000	15.0		N Lat 42° 43' 34.0
WRZA	260	99.9	MHz	B	FM	LIC	PARK FOREST	IL	US	BMLH	-20010511ABE	23476	50.0	kW	150.150.	359.0	359.0	149.	149.	N Lat 41° 18' 4.00
WGLC-FM	261	100.1	MHz	A	FM	LIC	MENDOTA	IL	US	BLH	-19911023KA	41165	6.00	kW	100.100.	326.0	326.0	107.	107.	N Lat 41° 32' 16.0
WGLB-FM	261	100.1	MHz	A	FM	LIC	PORT WASHINGTON	WI	US	BLH	-19970624KC	73051	6.00	kW	97.097.0	349.0	349.0	59.0	59.0	N Lat 43° 25' 14.0
--	261	100.1	MHz	A	FA	USED	MENDOTA	IL	US			41165								N Lat 41° 32' 16.0
--	261	100.1	MHz	A	FA	USED	PORT WASHINGTON	WI	US			73051								N Lat 43° 23' 10.0
WNND	262	100.3	MHz	B	FM	LIC	CHICAGO	IL	US	BLH	-19891120KC	10059	8.30	kW	358.358.	538.0	538.0	357.	357.	N Lat 41° 53' 56.0
--	262	100.3	MHz	B	FA	USED	CHICAGO	IL	US			10059								N Lat 41° 53' 56.0
NEW	262	100.3	MHz	L1	FL	APP	ROCKFORD	IL	US	BNPL	-20000829ACS	125839		kW		0.000	0.000	26.0		N Lat 42° 17' 41.0
NEW	262	100.3	MHz	L1	FL	APP	ROCKFORD	IL	US	BNPL	-20000829ADB	126129		kW		0.000	0.000	26.0		N Lat 42° 17' 41.0
NEW	262	100.3	MHz	L1	FL	APP	ROCKFORD	IL	US	BNPL	-20000830AAT	126171		kW		0.000	0.000	26.0		N Lat 42° 17' 41.0
NEW	262	100.3	MHz	L1	FL	APP	ROCKFORD	IL	US	BNPL	-20000828AHD	126387		kW		0.000	0.000	277.		N Lat 42° 16' 15.0
WNND	262	100.3	MHz	B	FM	CP	CHICAGO	IL	US	BPH	-20000614ACK	10059	5.70	kW	425.425.	606.0	606.0	425.	425.	N Lat 41° 53' 56.0
WTLX	263	100.5	MHz	A	FM	LIC	COLUMBUS	WI	US	BLH	-19920505KA	4477	6.00	kW	100.100.	394.0	394.0	95.0	95.0	N Lat 43° 20' 4.00
WTLX	263	100.5	MHz	A	FM	CP	COLUMBUS	WI	US	BPH	-19981130ID	4477	6.00	kW	100.100.	398.0	398.0	86.0	86.0	N Lat 43° 16' 28.0
--	263	100.5	MHz	A	FA	USED	COLUMBUS	WI	US	Dkt	84-231	4477								N Lat 43° 22' 22.0
--	264	100.7	MHz	A	FA	USED	COAL CITY	IL	US	Dkt	84-231	3959								N Lat 41° 17' 6.00
WKKV-FM	264	100.7	MHz	B	FM	LIC	RACINE	WI	US	BLH	-6198	68758	50.0	kW	152.152.	386.0	386.0	142.	142.	N Lat 42° 48' 18.0
--	264	100.7	MHz	B	FA	USED	RACINE	WI	US			68758								N Lat 42° 48' 18.0
WBVS	264	100.7	MHz	A	FM	LIC	COAL CITY	IL	US	BLH	-20000111AGQ	3959	2.45	kW	147.147.	319.0	319.0	148.	148.	N Lat 41° 17' 39.0
WQFL	265	100.9	MHz	A	FM	CP MOD	ROCKFORD	IL	US	BMPH	-19990317IB	54255	2.70	kW	149.149.	396.0	396.0	135.	135.	N Lat 42° 19' 20.0
WQFL	265	100.9	MHz	A	FM	LIC	ROCKFORD	IL	US	BLH	-6224	54255	3.00	kW	91.091.0	339.0	339.0	81.0	81.0	N Lat 42° 19' 17.0
--	265	100.9	MHz	A	FA	USED	PERU	IL	US			69732								N Lat 41° 17' 32.0
--	265	100.9	MHz	A	FA	USED	ROCKFORD	IL	US			54255								N Lat 42° 19' 17.0
NEW	265	100.9	MHz	L1	FL	APP	NORTON SHORES	MI	US	BNPL	-20000831ADP	126701		kW	37.5	221.7	0.000	7.75		N Lat 43° 09' 52.0
WKQX	266	101.1	MHz	B	FM	LIC	CHICAGO	IL	US	BLH	-19940810KB	19525	8.30	kW	358.358.	538.0	538.0	357.	357.	N Lat 41° 53' 56.0
--	266	101.1	MHz	B	FA	USED	CHICAGO	IL	US			19525								N Lat 41° 53' 56.0
WKQX	266	101.1	MHz	B	FM	CP	CHICAGO	IL	US	BPH	-20000804ABS	19525	5.70	kW	425.425.	606.0	606.0	425.	425.	N Lat 41° 53' 56.0
WIBA-FM	268	101.5	MHz	B	FM	LIC	MADISON	WI	US	BLH	-19950824KC	17385	12.0	kW	309.309.	609.0	609.0	266.	266.	N Lat 43° 03' 21.0
W227AG	268	101.5	MHz	D	FX	APP	DE KALB	IL	US	BPFT	-19971104TI	13937	.170	kW	28.028.0	291.0	291.0	24.0	24.0	N Lat 41° 55' 44.0
--	268	101.5	MHz	B	FA	USED	MADISON	WI	US			17385								N Lat 43° 03' 22.0
NEW	268	101.5	MHz	L1	FL	APP	ROUND LAKE HEIGHTS	IL	US	BNPL	-20000828AAW	125575		kW	25.6	262.7	0.000	25.0		N Lat 42° 23' 5.00
NEW	268	101.5	MHz	L1	FL	CP	GRANT PARK	IL	US	BNPL	-20000901ADK	125927		kW	56.2	265.0	0.000	26.0		N Lat 41° 14' 41.0
NEW	268	101.5	MHz	L1	FL	APP	ANTIOCH	IL	US	BNPL	-20000829ADU	126337		kW		0.000	0.000	21.0		N Lat 42° 29' 25.0
NEW	268	101.5	MHz	L1	FL	APP	LAKE VILLA	IL	US	BNPL	-20000831ADG	126664		kW		0.000	0.000	18.0		N Lat 42° 25' 18.0
W269AD	269	101.7	MHz	D	FX	LIC	SHEBOYGAN, ETC.	WI	US	BLFT	-19801118JC	65953	.007	kW	29.0	237.0				N Lat 43° 44' 18.0
WIXN-FM	269	101.7	MHz	A	FM	LIC	DIXON	IL	US	BMLH	-19910822KH	21203	6.00	kW	100.100.	326.0	326.0	97.0	97.0	N Lat 41° 49' 29.0
--	269	101.7	MHz	A	FA	USED	DIXON	IL	US			21203								N Lat 41° 49' 29.0
WTMX	270	101.9	MHz	B	FM	LIC	SKOKIE	IL	US	BLH	-19830224AE	6377	4.20	kW	475.475.	657.0	657.0	475.	475.	N Lat 41° 52' 44.0
WTMX	270	101.9	MHz	B	FM	CP	SKOKIE	IL	US	BPH	-19981029IA	6377	4.20	kW	476.476.	657.0	657.0	475.	475.	N Lat 41° 52' 44.0
--	270	101.9	MHz	B	FA	USED	SKOKIE	IL	US			6377								N Lat 41° 52' 44.0
NEW	270	101.9	MHz	L1	FL	APP	BELVIDERE	IL	US	BNPL	-20000901AAL	126594		kW	-117	130.0	0.000	28.0		N Lat 42° 16' 54.0

WLUM-FM	271	102.1 MHz	B	FM	LIC	MILWAUKEE	WI	US	BLH	-19900523KA	63595	20.0 kW	232.232.	441.0	441.0	249.	249.	N Lat 43° 05' 48.0
WALS	271	102.1 MHz	A	FM	LIC	OGLESBY	IL	US	BLH	-19930208KA	17316	1.35 kW	147.147.	331.0	331.0	136.	136.	N Lat 41° 18' 5.00
WLUM-FM	271	102.1 MHz	B	FS	LIC	MILWAUKEE	WI	US	BLH	-19971126KG	63595	3.80	63.063.0	261.0	261.0	69.0	69.0	N Lat 43° 05' 48.0
WALS	271	102.1 MHz	A	FM	CP	OGLESBY	IL	US	BPH	-19990820IJ	17316	1.50 kW	142.142.	336.0	336.0	138.	138.	N Lat 41° 17' 32.0
--	271	102.1 MHz	A	FA	USED	LENA	IL	US			27730							N Lat 42° 18' 27.0
--	271	102.1 MHz	B	FA	USED	MILWAUKEE	WI	US			63595							N Lat 43° 05' 48.0
--	271	102.1 MHz	A	FA	USED	OGLESBY	IL	US	Dkt	89-517	15168							N Lat 41° 17' 43.0
931208MB	271	102.1 MHz	A	FM	CP MOD	LENA	IL	US	BMPH	-20010706AAT	59674	5.20 kW	107.107.	377.6	377.6	92.0	92.0	N Lat 42° 20' 31.0
WXLC	272	102.3 MHz	A	FM	LIC	WAUKEGAN	IL	US	BLH	-19850122LR	10451	3.00 kW	98.098.0	309.0	309.0	95.0	95.0	N Lat 42° 20' 59.0
WGTC	272	102.3 MHz	A	FM	LIC	NEW CARLISLE	IN	US	BLH	-19890810KB	63772	2.00 kW	121.121.	346.0	346.0	109.	109.	N Lat 41° 43' 38.0
WRHL-FM	272	102.3 MHz	A	FM	LIC	ROCHELLE	IL	US	BMLH	-19970220KC	57269	4.60 kW	55.055.0	306.0	306.0	66.0	66.0	N Lat 41° 55' 24.0
--	272	102.3 MHz	A	FA	USED	CRETE	IL	US			73700							N Lat 41° 18' 53.0
--	272	102.3 MHz	A	FA	USED	ROCHELLE	IL	US			57269							N Lat 41° 55' 24.0
--	272	102.3 MHz	A	FA	USED	WAUKEGAN	IL	US			10451							N Lat 42° 20' 59.0
--	272	102.3 MHz	A	FA	USED	NEW CARLISLE	IN	US			63772							N Lat 41° 43' 38.0
WYBA	272	102.3 MHz	A	FM	LIC	CRETE	IL	US	BLH	-20000124AAU	73700	1.05 kW	152.152.	370.0	370.0	150.	150.	N Lat 41° 19' 32.0
WNWC-FM	273	102.5 MHz	B	FM	LIC	MADISON	WI	US	BLH	-3247	49781	50.0 kW	137.137.	439.0	439.0	91.0	91.0	N Lat 43° 02' 7.00
--	273	102.5 MHz	B	FA	USED	MADISON	WI	US			49781							N Lat 43° 02' 7.00
--	274	102.7 MHz	B	FA	USED	OAK PARK	IL	US			6588							N Lat 41° 53' 56.0
WVAZ	274	102.7 MHz	B	FM	LIC	OAK PARK	IL	US	BLH	-5595	6588	6.00 kW	357.357.	538.0	538.0	357.	357.	N Lat 41° 53' 56.0
WVAZ	274	102.7 MHz	B	FS	LIC	OAKPARK	IL	US	BXLH	-20001113AAF	6588	35.0	89.089.0	270.0	270.0	93.0	93.0	N Lat 41° 51' 39.0
WVAZ	274	102.7 MHz	B	FS	CP	OAK PARK	IL	US	BXPH	-20010427AAE	6588	4.00	425.425.	606.0	606.0	425.	425.	N Lat 41° 53' 56.0
WLZR	275	102.9 MHz	B	FM	LIC	MILWAUKEE	WI	US	BLH	-19890921KA	36372	50.0 kW	133.133.	352.0	352.0	138.	138.	N Lat 43° 02' 49.0
WLZR	275	102.9 MHz	B	FM	CP	MILWAUKEE	WI	US	BPH	-19990624IC	36372	50.0 kW	130.130.	349.0	349.0	135.	135.	N Lat 43° 02' 49.0
--	275	102.9 MHz	A	FA	VACANT	EARLVILLE	IL	US	Dkt	97-48	86156							N Lat 41° 38' 55.0
--	275	102.9 MHz	B	FA	USED	MILWAUKEE	WI	US			36372							N Lat 43° 02' 49.0
WMKB	275	102.9 MHz	A	FM	CP	EARLVILLE	IL	US	BPH	-19970904MC	88204	2.00 kW	173.173.	420.0	420.0	146.	146.	N Lat 41° 37' 14.0
WGFB	276	103.1 MHz	A	FM	LIC	ROCKTON	IL	US	BLH	-19891218KB	73975	1.20 kW	160.160.	402.0	402.0	147.	147.	N Lat 42° 22' 2.00
WYXX	276	103.1 MHz	A	FM	LIC	MORRIS	IL	US	BLH	-19990609KB	17038	6.00 kW	100.100.	266.0	266.0	98.0	98.0	N Lat 41° 17' 35.0
WXXY-FM	276	103.1 MHz	A	FM	LIC	HIGHLAND PARK	IL	US	BLH	-19990730KB	74177	6.00 kW	100.100.	318.0	318.0	102.	102.	N Lat 42° 08' 14.0
--	276	103.1 MHz	A	FA	USED	HIGHLAND PARK	IL	US			74177							N Lat 42° 09' 24.0
--	276	103.1 MHz	A	FA	USED	ROCKTON	IL	US			73975							N Lat 42° 22' 2.00
--	276	103.1 MHz	A	FA	USED	MORRIS	IL	US	Dkt	90-137	17038							N Lat 41° 18' 39.0
W277AC	277	103.3 MHz	D	FX	LIC	WATERTOWN	WI	US	BLFT	-19950925TT	24447	.120 kW	34.034.0	294.0	294.0	17.0	17.0	N Lat 43° 11' 30.0
W277AE	277	103.3 MHz	D	FX	LIC	MADISON	WI	US	BLFT	-19970609TL	76223	.038 kW	50.050.0	346.0	346.0	9.00	9.00	N Lat 43° 03' 5.00
--	277	103.3 MHz	A	FA	USED	SPRING VALLEY	IL	US	Dkt	84-231	28312							N Lat 41° 19' 32.0
NEW	277	103.3 MHz	L1	FL	APP	SHEBOYGAN	WI	US	BNPL	-20010122AGH	132166	kW		0.000	0.000	31.6		N Lat 43° 44' 33.0
NEW	277	103.3 MHz	L1	FL	APP	FORT ATKINSON	WI	US	BNPL	-20010122AHA	132245	kW		0.000	0.000	44.0		N Lat 42° 58' 0.00
--	278	103.5 MHz	B	FA	USED	CHICAGO	IL	US			57089							N Lat 41° 52' 44.0
WKSC-FM	278	103.5 MHz	B	FM	LIC	CHICAGO	IL	US	BLH	-20010413AAM	74178	4.30 kW	472.472.	653.0	653.0	472.	472.	N Lat 41° 52' 44.0
WYTC	279	103.7 MHz	A	FM	LIC	HARTFORD	MI	US	BLH	-19960314KC	57954	3.00 kW	100.100.	301.0	301.0	85.0	85.0	N Lat 42° 18' 2.00
--	279	103.7 MHz	A	FA	USED	HARTFORD	MI	US	Dkt	84-231	1739							N Lat 42° 16' 41.0
--	279	103.7 MHz	B	FA	USED	WAUWATOSA	WI	US			27031							N Lat 43° 05' 48.0
WXSS	279	103.7 MHz	B	FM	LIC	WAUWATOSA	WI	US	BMLH	-20010731ABY	27031	19.5 kW	257.257.	466.0	466.0	274.	274.	N Lat 43° 05' 48.0
WZCH	280	103.9 MHz	A	FM	LIC	DUNDEE	IL	US	BLH	-19930222KC	3135	2.55 kW	98.098.0	361.0	361.0	87.0	87.0	N Lat 42° 06' 21.0
WXRD	280	103.9 MHz	A	FM	LIC	CROWN POINT	IN	US	BLH	-5664	39382	3.00 kW	91.091.0	303.0	303.0	90.0	90.0	N Lat 41° 19' 24.0
--	280	103.9 MHz	A	FA	USED	DUNDEE	IL	US			3135							N Lat 42° 06' 20.0
--	280	103.9 MHz	A	FA	USED	CROWN POINT	IN	US			39382							N Lat 41° 19' 24.0
NEW	280	103.9 MHz	L1	FL	CP	CHANNAHON	IL	US	BNPL	-20000901AFW	126923	kW	57.9	232.0	0.000	30.0		N Lat 41° 26' 32.0
WZEE	281	104.1 MHz	B	FM	LIC	MADISON	WI	US	BLH	-19980716KB	41980	12.0 kW	306.306.	602.0	602.0	277.	277.	N Lat 43° 03' 3.00
--	281	104.1 MHz	B	FA	USED	MADISON	WI	US			41980							N Lat 43° 03' 9.00
WJMK	282	104.3 MHz	B	FM	LIC	CHICAGO	IL	US	BLH	-19870506KJ	28621	4.10 kW	480.480.	659.0	659.0	478.	478.	N Lat 41° 52' 44.0
--	282	104.3 MHz	B	FA	USED	CHICAGO	IL	US			28621							N Lat 41° 52' 44.0
WXER	283	104.5 MHz	A	FM	LIC	PLYMOUTH	WI	US	BLH	-19920706KD	60042	6.00 kW	100.100.	390.0	390.0	30.0	30.0	N Lat 43° 43' 32.0
WSLD	283	104.5 MHz	A	FM	LIC	WHITEWATER	WI	US	BLH	-19921125KD	60612	6.00 kW	100.100.	381.0	381.0	81.0	81.0	N Lat 42° 43' 38.0
--	283	104.5 MHz	A	FA	USED	PLYMOUTH	WI	US	Dkt	84-231	32847							N Lat 43° 45' 0.00
WCCX	283	104.5 MHz	D	FM	LIC	WAUKESHA	WI	US	BLED	-1802	68288	.013 kW	15.015.0	282.0	282.0	20.0	20.0	N Lat 43° 00' 16.0
--	283	104.5 MHz	A	FA	USED	WHITEWATER	WI	US	Dkt	84-231	4946							N Lat 42° 49' 13.0

WCFL	284	104.7 MHz	B	FM LIC	MORRIS	IL	US	BLH	-19920129KB	28304	50.0	kW	137.137.	316.0	316.0	145.	145.	N Lat 41° 21' 17.0
WEXT	284	104.7 MHz	A	FM LIC	STURTEVANT	WI	US	BLH	-19930524KA	53506	3.00	kW	100.100.	312.0	312.0	89.0	89.0	N Lat 42° 46' 7.00
WEXT	284	104.7 MHz	A	FM CP	STURTEVANT	WI	US	BPH	-19980729IC	53506	6.00	kW	98.098.0	310.0	310.0	87.0	87.0	N Lat 42° 46' 7.00
--	284	104.7 MHz	B	FA USED	MORRIS	IL	US			28304								N Lat 41° 20' 5.00
--	284	104.7 MHz	A	FA USED	STURTEVANT	WI	US	Dkt	85-253	53506								N Lat 42° 44' 55.0
WXRX	285	104.9 MHz	A	FM LIC	BELVIDERE	IL	US	BLH	-19911009KG	672	4.00	kW	122.122.	373.0	373.0	94.0	94.0	N Lat 42° 19' 21.0
WTKM-FM	285	104.9 MHz	A	FM LIC	HARTFORD	WI	US	BLH	-19920413KC	34303	5.80	kW	91.091.0	396.0	396.0	91.0	91.0	N Lat 43° 16' 48.0
--	285	104.9 MHz	A	FA USED	BELVIDERE	IL	US			672								N Lat 42° 14' 50.0
--	285	104.9 MHz	A	FA USED	HARTFORD	WI	US			34303								N Lat 43° 16' 48.0
NEW	285	104.9 MHz	L1	FL APP	FENNVILLE	MI	US	BNPL	-20000828ACM	125878		kW	0.00	206.0	0.000	12.0		N Lat 42° 35' 50.0
WOJO	286	105.1 MHz	B	FM LIC	EVANSTON	IL	US	BLH	-19910104KA	67073	8.40	kW	358.358.	538.0	538.0	358.	358.	N Lat 41° 53' 56.0
WBZU	286	105.1 MHz	A	FM LIC	WAUNAKEE	WI	US	BLH	-19920427KD	73655	6.00	kW	74.074.0	362.0	362.0	56.0	56.0	N Lat 43° 13' 20.0
960625TD	286	105.1 MHz	D	FX APP	MILWAUKEE	WI	US	BPFT	-19960625TD	82430	.099	kW	167.167.	373.0	373.0	181.	181.	N Lat 43° 05' 48.0
961004TC	286	105.1 MHz	D	FX APP	MILWAUKEE	WI	US	BPFT	-19961004TC	84017	.099	kW	167.	367.0	367.0	180.	180.	N Lat 43° 02' 18.0
--	286	105.1 MHz	A	FA USED	WAUNAKEE	WI	US	Dkt	88-174	5040								N Lat 43° 12' 34.0
--	286	105.1 MHz	B	FA USED	EVANSTON	IL	US			23605								N Lat 41° 53' 56.0
WOJO	286	105.1 MHz	B	FM CP	EVANSTON	IL	US	BPH	-20000613ABB	67073	5.70	kW	425.425.	606.0	606.0	425.	425.	N Lat 41° 53' 56.0
--	287	105.3 MHz	A	FA USED	MUKWONAGO	WI	US	Dkt	97-92	88003								N Lat 42° 54' 15.0
NEW	287	105.3 MHz	L1	FL APP	SOUTH BEND	IN	US	BNPL	-20000607AAE	123876		kW	-2.9	227.0	0.000	14.0		N Lat 41° 41' 16.1
NEW	287	105.3 MHz	L1	FL APP	BENTON HARBOR	MI	US	BNPL	-20000901AEU	126875		kW	14.9	203.3	0.000	22.0		N Lat 42° 07' 6.00
NEW	287	105.3 MHz	L1	FL APP	BENTON HARBOR	MI	US	BNPL	-20000831AEA	126885		kW	53.0	244.8	0.000	30.5		N Lat 42° 05' 19.3
NEW	287	105.3 MHz	L1	FL APP	BERRIEN SPRINGS	MI	US	BNPL	-20000901AFQ	126911		kW		0.000	0.000	30.0		N Lat 41° 57' 42.0
NEW	287	105.3 MHz	L1	FL APP	PORT WASHINGTON	WI	US	BNPL	-20010122AHQ	132267		kW		0.000	0.000	17.0		N Lat 43° 23' 11.0
970821MB	287	105.3 MHz	A	FM CP MOD	MUKWONAGO	WI	US	BMPH	-20010123ABX	88081	1.65	kW	193.193.	453.0	453.0	143.	143.	N Lat 42° 58' 5.00
NEW	287	105.3 MHz	L1	FL APP	DECATUR	MI	US	BNPL	-20000831COX	132638		kW		0.000	0.000	0.00		N Lat 42° 10' 52.0
WLJE	288	105.5 MHz	A	FM LIC	VALPARAISO	IN	US	BLH	-19880129KB	53056	1.25	kW	156.156.	377.0	377.0	118.	118.	N Lat 41° 31' 28.0
WMMM-FM	288	105.5 MHz	A	FM LIC	VERONA	WI	US	BLH	-19950523KA	73663	2.00	kW	175.175.	472.0	472.0	104.	104.	N Lat 42° 57' 32.0
WYKT	288	105.5 MHz	A	FM LIC	WILMINGTON	IL	US	BLH	-19970602KK	36120	1.30	kW	147.147.	316.0	316.0	146.	146.	N Lat 41° 17' 11.0
WZSR	288	105.5 MHz	A	FM LIC	WOODSTOCK	IL	US	BLH	-19971117KC	53505	1.60	kW	173.173.	433.0	433.0	150.	150.	N Lat 42° 15' 34.0
--	288	105.5 MHz	A	FA USED	VERONA	WI	US	Dkt	87-524	14861								N Lat 42° 59' 24.0
--	288	105.5 MHz	A	FA USED	WILMINGTON	IL	US			36120								N Lat 41° 17' 13.0
--	288	105.5 MHz	A	FA USED	WOODSTOCK	IL	US			53505								N Lat 42° 15' 30.0
--	288	105.5 MHz	A	FA USED	VALPARAISO	IN	US			53056								N Lat 41° 31' 28.0
NEW	288	105.5 MHz	L1	FL APP	NOTRE DAME	IN	US	BNPL	-20000605AMD	124756		kW	17.0	248.1	0.000	24.2		N Lat 41° 42' 7.00
WMMM-FM	288	105.5 MHz	A	FS CP	VERONA	WI	US	BXPH	-20000710AAS	73663	4.00		117.117.	415.0	415.0	46.0	46.0	N Lat 42° 57' 32.0
NEW	288	105.5 MHz	L1	FL APP	NILES	MI	US	BNPL	-20000831AAL	126299		kW		0.000	0.000	29.0		N Lat 41° 48' 14.0
W289AB	289	105.7 MHz	D	FX LIC	ROCKFORD	IL	US	BLFT	-19921007TC	49549	.055	kW	47.047.0	286.0	286.0			N Lat 42° 16' 1.00
NEW	289	105.7 MHz	L1	FL APP	WATERTOWN	WI	US	BNPL	-20010122AKI	132276		kW		0.000	0.000	21.2		N Lat 43° 11' 43.0
WCKG	290	105.9 MHz	B	FM LIC	ELMWOOD PARK	IL	US	BLH	-19830304AF	71283	4.10	kW	482.482.	661.0	661.0	480.	480.	N Lat 41° 52' 44.0
--	290	105.9 MHz	A	FA USED	EVANSVILLE	WI	US	Dkt	84-231	59612								N Lat 42° 43' 41.0
--	290	105.9 MHz	B	FA USED	ELMWOOD PARK	IL	US			71283								N Lat 41° 52' 44.0
WKPO	290	105.9 MHz	A	FM LIC	EVANSVILLE	WI	US	BLH	-20000712AAF	59612	1.70	kW	147.147.	422.0	422.0	139.	139.	N Lat 42° 43' 38.0
WMIL-FM	291	106.1 MHz	B	FM LIC	WAUKESHA	WI	US	BLH	-19940516KA	63919	13.0	kW	297.297.	507.0	507.0	306.	306.	N Lat 43° 05' 15.0
WYYS	291	106.1 MHz	A	FM LIC	STREATOR	IL	US	BLH	-19950315KD	35058	3.00	kW	89.089.0	283.0	283.0	85.0	85.0	N Lat 41° 10' 49.0
--	291	106.1 MHz	A	FA USED	STREATOR	IL	US	Dkt	89-70	15533								N Lat 41° 07' 30.0
--	291	106.1 MHz	B	FA USED	WAUKESHA	WI	US			63919								N Lat 43° 05' 18.0
WYCA	292	106.3 MHz	A	FM LIC	LANSING	IL	US	BLH	-19860430KC	6590	2.00	kW	121.121.	309.0	309.0	126.	126.	N Lat 41° 34' 44.0
WUBU	292	106.3 MHz	A	FM LIC	SOUTH BEND	IN	US	BLH	-19921016KA	21927	3.00	kW	89.089.0	320.0	320.0	104.	104.	N Lat 41° 40' 36.0
WWQM-FM	292	106.3 MHz	A	FM LIC	MIDDLETON	WI	US	BMLH	-19990105KA	19623	4.50	kW	114.114.	412.0	412.0	88.0	88.0	N Lat 43° 03' 3.00
--	292	106.3 MHz	A	FA USED	LANSING	IL	US			6590								N Lat 41° 34' 44.0
--	292	106.3 MHz	A	FA USED	MIDDLETON	WI	US			19623								N Lat 43° 03' 1.00
--	292	106.3 MHz	A	FA USED	SOUTH BEND	IN	US	Dkt	84-231	21927								N Lat 41° 44' 11.0
--	292	106.3 MHz	A	FA USE	GENOA	IL	US	Dkt	99-64	106495								N Lat 42° 01' 0.00
WYCH	292	106.3 MHz	A	FM LIC	GENOA	IL	US	BLH	-20001215AAF	21202	2.50	kW	30.0	261.0		20.0		N Lat 42° 06' 1.00
WYCH	292	106.3 MHz	A	FM CP	GENOA	IL	US	BPH	-20010130AAY	21202	6.00	kW	65.065.0	319.0	319.0	52.0	52.0	N Lat 42° 04' 28.0
WYCH	292	106.3 MHz	A	FM APP	GENOA	IL	US	BMPH	-20011004AAC	21202	3.80	kW	126.126.	380.0	380.0	113.	113.	N Lat 42° 04' 28.0
WKCH	293	106.5 MHz	A	FM CP MOD	WHITEWATER	WI	US	BMPH	-19961021ID	59406	6.00	kW	61.061.0	317.0	317.0	77.0	77.0	N Lat 42° 54' 24.0
WWJR	293	106.5 MHz	A	FM LIC	SHEBOYGAN FALLS	WI	US	BLH	-19970418KB	41614	6.00	kW	73.073.0	279.0	279.0	85.0	85.0	N Lat 43° 43' 16.0

--	293	106.5	MHz	A	FA	USED	SHEBOYGAN FALLS	WI	US	Dkt	92-228	41614								N Lat	43°	42'	44.0
--	293	106.5	MHz	A	FA	USED	WHITEWATER	WI	US	Dkt	89-132	20416								N Lat	42°	54'	2.00
WZFS	294	106.7	MHz	B	FM	LIC	DES PLAINES	IL	US	BLH	-19990818KA	25053	50.0	kW	129.129.	347.0	347.0	131.	131.	N Lat	42°	08'	14.0
--	294	106.7	MHz	B	FA	USED	DES PLAINES	IL	US			25053								N Lat	42°	08'	10.0
NEW	294	106.7	MHz	L1	FL	APP	THREE OAKS	MI	US	BNPL	-20000830ABK	126309		kW		0.000	0.000	21.0		N Lat	41°	48'	16.0
NEW	294	106.7	MHz	L1	FL	APP	THREE OAKS	MI	US	BNPL	-20000830ABM	126310		kW		0.000	0.000	15.0		N Lat	41°	48'	16.0
NEW	294	106.7	MHz	L1	FL	APP	THREE OAKS	MI	US	BNPL	-20000830ABT	126344		kW		0.000	0.000	15.0		N Lat	41°	48'	5.00
NEW	294	106.7	MHz	L1	FL	APP	THREE OAKS	MI	US	BNPL	-20000901AGN	126959		kW		0.000	0.000	19.0		N Lat	41°	48'	3.00
NEW	294	106.7	MHz	L1	FL	APP	BEAVER DAM	WI	US	BNPL	-20010122AFA	132230		kW		0.000	0.000	22.6		N Lat	43°	28'	9.00
WFMR	295	106.9	MHz	A	FM	LIC	BROOKFIELD	WI	US	BLH	-19950830KF	67484	6.00	kW	100.100.	358.0	358.0	97.0	97.0	N Lat	43°	09'	0.00
W295AF	295	106.9	MHz	D	FX	LIC	LA PORTE	IN	US	BLFT	-19970819TA	85655	.013	kW	74.0		290.0		30.0	N Lat	41°	40'	7.00
--	295	106.9	MHz	A	FA	USED	BROOKFIELD	WI	US	Dkt	85-198	17207								N Lat	43°	07'	36.0
--	295	106.9	MHz	A	FA	VACANT	FREEPORT	IL	US	Dkt	97-67	95147								N Lat	42°	19'	28.0
WSPY	296	107.1	MHz	A	FM	LIC	PLANO	IL	US	BLH	-19900716KG	48247	1.50	kW	142.142.	348.0	348.0	146.	146.	N Lat	41°	39'	55.0
WIRX	296	107.1	MHz	A	FM	LIC	ST. JOSEPH	MI	US	BLH	-19901010KE	74005	1.20	kW	152.152.	359.0	359.0	137.	137.	N Lat	42°	04'	19.0
WZVN	296	107.1	MHz	A	FM	LIC	LOWELL	IN	US	BLH	-19981217KA	24727	1.30	kW	153.153.	366.0	366.0	150.	150.	N Lat	41°	21'	10.0
WZVN	296	107.1	MHz	A	FS	LIC	LOWELL	IN	US	BLH	-19981217KB	24727	.500		91.091.0	300.0	300.0	86.0	86.0	N Lat	41°	17'	50.0
--	296	107.1	MHz	A	FA	USED	PLANO	IL	US			48247								N Lat	41°	39'	42.0
--	296	107.1	MHz	A	FA	USED	LOWELL	IN	US			24727								N Lat	41°	21'	9.00
--	296	107.1	MHz	A	FA	USED	ST. JOSEPH	MI	US			74005								N Lat	42°	04'	19.0
WSJY	297	107.3	MHz	B	FM	LIC	FORT ATKINSON	WI	US	BLH	-19900817KC	24442	26.0	kW	206.206.	474.0	474.0	200.	200.	N Lat	42°	48'	2.00
--	297	107.3	MHz	B	FA	USED	FORT ATKINSON	WI	US			95999								N Lat	42°	50'	48.0
--	298	107.5	MHz	B	FA	USED	CHICAGO	IL	US			51165								N Lat	41°	52'	57.0
WGCI-FM	298	107.5	MHz	B	FM	LIC	CHICAGO	IL	US	BLH	-20010413AAL	51165	3.70	kW	472.472.	653.0	653.0	472.	472.	N Lat	41°	52'	44.0
WLLT	299	107.7	MHz	A	FM	LIC	POLO	IL	US	BLH	-19891218KA	59235	1.35	kW	145.145.	371.0	371.0	116.	116.	N Lat	41°	53'	52.0
--	299	107.7	MHz	A	FA	USED	POLO	IL	US	Dkt	84-231	95567								N Lat	41°	59'	6.00
--	299	107.7	MHz	B	FA	USED	MILWAUKEE	WI	US			73059								N Lat	42°	57'	51.0
WVCY-FM	299	107.7	MHz	B	FM	LIC	MILWAUKEE	WI	US	BLED	-20010710AAS	73059	43.0	kW	161.161.	403.0	403.0	144.	144.	N Lat	42°	57'	46.0
WLEY-FM	300	107.9	MHz	B	FM	LIC	AURORA	IL	US	BLH	-19910827KB	71282	21.0	kW	232.232.	455.0	455.0	223.	223.	N Lat	41°	56'	1.00
WLEY-FM	300	107.9	MHz	B	FS	CP	AURORA	IL	US	BPH	-19981021IE	71282	10.5		134.134.	341.0	341.0	133.	133.	N Lat	41°	51'	30.0
--	300	107.9	MHz	B	FA	USED	AURORA	IL	US			71282								N Lat	41°	46'	10.0
NEW	300	107.9	MHz	L1	FL	APP	UNION PIER	MI	US	BNPL	-20000830AAZ	126255		kW		0.000	0.000	15.0		N Lat	41°	50'	22.0
NEW	300	107.9	MHz	L1	FL	APP	LAKESIDE	MI	US	BNPL	-20000830ABD	126260		kW		0.000	0.000	15.0		N Lat	41°	50'	32.0
NEW	300	107.9	MHz	L1	FL	APP	SAWYER	MI	US	BNPL	-20000831AAS	126342		kW		0.000	0.000	15.0		N Lat	41°	52'	5.00

First Record

*** End of Data File ***
533 Records Retrieved

Federal/Non-Federal Interoperability

Law Enforcement Incident Response

VHF	
Calling	167.0875
Inop 1	167.0875
Inop 2/6	167.2500
Inop 3/7	167.7500
Inop 4/8	168.1125
Inop 5	168.4625
UHF	
Calling	414.0375
Inop 1/7	409.9875
Inop 2/8	410.1875
Inop 3/9	410.6125
Inop 4	414.0625
Inop 5	414.3125
Inop 6	414.3375
VHF	
Calling	169.5375
VHF 1/6	170.0125
VHF 2/7	170.4125
VHF 3/8	170.6875
VHF 4/9	173.0375
VHF 5	169.3750
UHF	
Calling	410.2375
UHF 1/7	410.4375
UHF 2/8	410.6375
UHF 3/9	410.8375
UHF 4	413.1875
UHF 5	413.2125
UHF 6	410.2375

These frequencies are used for Federal and State/County/City law enforcement interagency operations. Some of these frequencies may be encoded.

Close this Window and return to FCC Allocation List

General Aviation Frequencies

Across the United States, there are specific aviation frequencies that can be heard almost anywhere. Here are most of them.

34.150 - Army Helicopters

34.650 - Army Helicopters

34.750 - Army Helicopters

41.500 - Army Helicopter Towers

118.925 - Firefighting emergency air tactics

118.950 - Firefighting emergency air tactics

119.950 - Firefighting Helibase air traffic control

121.500 - Emergency

121.600 - Ground Control/Civil Air Patrol Training Beacons

121.650 - Ground Control

121.700 - Ground Control

121.750 - Ground Control

121.800 - Ground Control

121.850 - Ground Control

121.900 - Ground Control (air-to-ground)

121.950 - Flight Schools

121.975 - Fight Service (private aircraft)

122.000 - Flight Service ("Flight Watch")

122.050 - Flight Service (Aircraft Transmit)

122.100 - Flight Service (Aircraft Transmit)

122.150 - Flight Service (Aircraft Transmit)

122.200 - Flight Service Stations (Common enroute)

122.250 - Balloons

122.300 - Flight Service Stations

122.350 - Flight Service Stations

122.400 - Flight Service Stations

122.450 - Flight Service Stations

122.500 - Flight Service Stations (Aircraft Transmit)

122.600 - Flight Service Stations (Airport Advisories)

122.700 - Unicom (Uncontrolled Airports)

122.725 - Unicom (Private Airports)

122.750 - Unicom (Air-to-air Communications)

122.800 - Unicom (Uncontrolled Airports)

122.850 - Multicom (Forest Service VHF-4 Helicopters)

122.900 - Multicom (Forest Service Air Tactics VHF-2/ Search and Rescue Training)

122.925 - Multicom (Plane To Plane/ Forest Service VHF-1)

122.950 - Unicom (Controlled Airports)

122.975 - Unicom (High Altitude)

123.000 - Unicom (Uncontrolled Airports)

123.025 - Unicom (Helicopters)

123.050 - Unicom (Heliports)

123.075 - Unicom (Heliports)

123.100 - Civil Air Patrol Search and Rescue

123.200 - Flight Schools

123.300 - Flight Schools and Balloons

123.400 - Flight Schools

123.450 - Multicom (Air-to-air Communications (unofficial))

123.500 - Flight Schools and Balloons

123.600 - Airport Advisory (Flight Service Stations) (Uncontrolled Airports)

123.650 - Flight Service

126.200 - Military Airports

130.650 - Military Airlift Command

134.100 - Military Airports - GCA Radar

135.975 - Federal Air Traffic Advisory VHF-7

138.450 - USAF Search and Rescue

138.750 - USAF Search and Rescue

138.875 - USAF Thunderbirds parachutists

140.400 - USAF Thunderbirds

142.000 - USAF Blue Angels Maintenance-A

142.025 - USAF Blue Angels Maintenance-D

142.625 - USAF Blue Angels Maintenance-C

143.000 - USAF Blue Angels Maintenance-B

143.600 - USAF Blue Angels Maintenance-E

148.125 - Civil Air Patrol Secondary Repeaters

148.150 - Civil Air Patrol Primary Repeaters

148.550 - USAF Thunderbirds Maintenance

156.300 - Aircraft-to-ship - safety

156.400 - Aircraft-to-ship - commercial

156.425 - Aircraft-to-ship - non-commercial

156.450 - Aircraft-to-ship - commercial

156.625 - Aircraft-to-ship - non-commercial

156.900 - Aircraft-to-ship - commercial

235.100 - USAF air-to-air refueling

236.600 - USAF Towers

237.900 - Coast Guard search and rescue

238.700 - USAF air-to-air refueling

238.900 - USAF air-to-air refueling

239.800 - FAA Weather

241.000 - Army/National Guard "Guard"

241.400 - USN Blue Angels

243.000 - Military Emergency

250.800 - US Navy Blue Angels

251.600 - US Navy Blue Angels

252.800 - USAF Tactical Training

254.600 - US Navy air-to-air refueling

255.400 - FAA Flight Service Stations

257.800 - Civilan Airport Towers

263.350 - US Navy Blue Angels

263.500 - US Navy Blue Angels

264.800 - Space Shuttle Chase

266.500 - USAF air-to-air refueling

273.500 - USAF Thunderbirds F-2

275.350 - US Navy Blue Angels

283.500 - USAF Thunderbirds

287.800 - Coast Guard Search and Rescue

295.700 - USAF Thunderbirds F-1

300.600 - US Navy air-to-air training

302.100 - US Navy Blue Angels

302.150 - US Navy Blue Angels

307.700 - US Navy Blue Angels

311.000 - STRATCOM Primary

318.900 - USAF ACC F-6

319.100 - FAA Air Traffic Control

319.400 - Military Airlift Command

319.800 - US Navy Blue Angels

321.000 - STRATCOM Secondary

322.300 - USAF Thunderbirds F-4

322.600 - USAF Thunderbirds F-5

324.200 - USAF ACC F-14

324.500 - USAF ACC F-12

325.500 - FAA Weather

335.800 - USAF ACC F-17

336.600 - USAF ACC F-18

340.800 - USAF air-to-air refueling

342.500 - FAA Weather

344.600 - FAA Weather

345.900 - US Navy Blue Angels

346.400 - USAF ACC F-4

349.000 - USAF ACC F-13

349.400 - USAF Towers

359.300 - USAF ACC F-3

360.400 - US Navy Blue Angels

362.600 - US Navy Blue Angels

363.800 - FAA air traffic control

364.200 - NORAD

378.900 - USAF Tactical

381.300 - USAF ACC Primary

381.800 - US Coast Guard Primary

382.900 - USAF Thunderbirds F-16

383.900 - Coast Guard Secondary

384.400 - US Navy Blue Angels

391.900 - US Navy Blue Angels

394.000 - USAF Thunderbirds F-7

395.900 - US Navy Blue Angels

UNICOM

Unicom is usually used by small civilan aircraft. It is used typically around uncontrolled (towerless) airports.

Almost all airports have Unicom. Stationed on the ground is a base operator who listens to the Unicom frequency assigned to that airport. He listens to the conversations of the pilots, radioing back answers if they ask questions. In a way, it is like an air traffic controller, except the base operator does not choose how the aircraft lands.

When a pilot is approaching the airport and wants to land, he uses this Unicom frequency to alert the base operator and other aircraft in the area his position intentions. Then, the pilot, not the base operator, sets himself up for a landing.

Large airplanes or helicopters can use Unicom, which is stationed at even large airports. They rarely do because it is easier to contact a tower for instructions. At large airports, where the sky is filled with hundreds of aircraft, it is safer and easier to have the tower direct the aircraft to landing. The most common Unicom frequency at a large airport is 122.950.

Return to 122.700

MULTICOM

Multicom is different from Unicom. When Multicom is used around airports, that usually means the airport has no fixed base operator. Like Unicom, pilots broadcast their position and intentions out into the area on a Multicom frequency. However, responses from other airplanes may not always be expected, and no responses will return from the ground.

Multicom's main purpose is to alert other aircraft of the pilot's intentions. Usually small planes use Multicom. Large aircraft could use it, but it would be meaningless. If the airport is too small to have a base operator, then it probably does not have enough runway space for large aircraft. Its most common frequency is 122.900, but there are many others.

The problem about Multicom is if aircraft in the sky need to communicate to the ground, there is no base operator to respond. That is the primary reason most aircraft divert away from airports that use Multicom.

Return To 122.900

UNCONTROLLED AIRPORTS

Uncontrolled Airports are the most abundant type of civilian airport in the United States. When an airport is defined as "uncontrolled," it means that there is no control tower to direct air traffic. The landings and takeoffs are entirely the pilot's responsibility.

Most of these uncontrolled airports are not entirely empty. Most of them contain Unicom, a radio frequency that can be used to receive information from a base operator on the ground. If you live near a small airport that receives a medium amount of air traffic, you will most likely hear a plane use the frequency often. If an uncontrolled airport does not use Unicom, it most likely uses Multicom, where the airplane or helicopter is on its own.

Return To 122.700

CONTROLLED AIRPORTS

Controlled Airports are airports that contain a control tower. Most busy airports with crowded airspace are controlled airports.

Controlled Airports have many frequencies. Depending on the size of the airport, airspace, and tower, the tower frequencies alone can be numerous. Most incoming traffic will identify the tower over the tower's frequencies. Controlled airports also communicate on "approach" frequencies. These are frequencies scattered possibly hundreds of miles from the tower in other airport's airspace. This helps line up the incoming aircraft for landings before they reach congested airspace.

Controlled Airports also used the Unicom frequency 122.950.

Return to 122.950

Digital Waveguide Modeling of Flared Acoustical tubes

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Abstract—The distributed reflection of the flared tube is calculated using the Schroedinger equation, including the effects of viscothermal and open end radiation losses. The reflection is approximated with digital filters, which are designed to be efficient and accurate in a digital waveguide model of a wind instrument. Weighted Least-Squares design techniques are applied to model the reflectance of a Bessel horn with an IIR filter.

Introduction

Digital waveguide modeling (DWM) techniques are widely used for simulation of wave propagation in musical instruments. The particular efficiency of DWM implementations is based on the separation between unfiltered propagation (digitally represented with delay lines), and additional physical phenomena, such as reflections, losses and dispersion (approximated with digital filters). DWM techniques have been successfully applied for simulation of wind instruments, where the main bore of the instrument is often represented by a single elemental tube shape (cylindrical, conical). Flared tube sections (bell, mouthpiece) are usually approximated with a series of small elemental segments. (see, f.e., [1], [2]). In the case of modeling a strongly flared tube (such as brass horns), using piecewise cylindrical segments often requires a large number of segments to enable sufficiently accurate results [3]. A much smaller number of conical segments would be enough, but unfortunately the time-domain filter representations of conical junctions have structural inherent instabilities [2]. Alternatively, the complete reflection and transmission characteristics of the horn may be calculated by applying Schroedinger's equation [4], and approximated with a single digital filter. This paper addresses the design of such a filter in a digital waveguide model. In section 2, the use of Schroedinger's equation is discussed, and a formulation with scattering and propagation matrices is presented. Further extensions are made in section 3 by incorporating the effects of viscothermal losses end open-end radiation. The design of an appropriate digital filter is discussed in section 4. Under the assumption that frequencies above the horn cut-off are mainly transmitted out of the horn, we aim to obtain a digital filter that has its main discrepancy in the phase response at the higher frequencies. The phase of the highpass transmitted wave energy is considered to be of minor perceptual importance, whereas the phase of the lowpass reflectance is essential to the sound generation mechanism in wind instruments, and should therefore be approximated accurately. The idea of 'guiding' the main discrepancy into the phase of the higher frequencies is to obtain a horn waveguide structure containing low-order digital filters that will be capable of sufficiently accurate real-time simulation. With these considerations in mind, both FIR and IIR filter design techniques were applied to approximate the analogue filter characteristics. As an example we applied our calculations to a Bessel horn, which is used in a trumpet simulation by Di Federico and Borin [5].

Schroedinger's Equation

Wave propagation in tubes of varying cross-section is modeled by Websters's equation:

$$\frac{\delta^2 p}{\delta z^2} + \frac{1}{S}\frac{\delta S}{\delta z}\frac{\delta p}{\delta z} = \frac{1}{c}\frac{\delta^2 p}{\delta t^2} \tag{1}$$

where z is the coordinate that corresponds to the position where the spherical wavefront surface S cuts the tube axis (see figure 1). In [6] a convenient coordinate transformation is used to rewrite (1) into the Schroedinger equation:

$$\frac{\delta^2 \psi}{\delta z^2} + [k - F_h(z)]\,\psi = 0 \tag{2}$$

Here $\psi = p\sqrt{S}$ is an alternative wave parameter,

$k = \omega/c$ is the free space wave number, and $F_h(z) = \delta^2 r/\delta z^2$ is the 'horn function'.

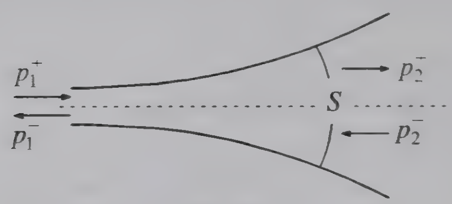

Figure 1: Wave propagation in the flared tube.

In order to find the filter characteristics of the wave propagation-path of ψ-waves in flared horns, we assume that the horn acts as a one-dimensional waveguide: i.e., ψ is a sum of right- and left-going waves:

$$\psi = \psi^+ + \psi^- = A\, e^{-jqz} + B\, e^{+jqz} \tag{3}$$

All attenuation and dispersion effects in the horn are expressed in the locally defined propagation constant $q(z)$, which is found by substituting (3) into (2):

$$q(z) = \sqrt{k^2 - F_h(z)} \tag{4}$$

According to (4), the characteristics of lossless wave propagation are spatially varying (as opposed to wave propagation in cylindrical and conical tubes), and are determined by the horn function. Since this function can be of arbitrary shape, no exact solutions of (1) can be found, and spatial discretization of the wave propagation-path is necessary. Assuming that at junctions between tube sections the pressure is constant and the total sum of incoming volume velocity flow equals zero, we found the following transmission-scattering matrices:

$$\begin{aligned} \mathbf{P}_n &= \begin{bmatrix} e^{+jqL} & 0 \\ 0 & e^{-jqL} \end{bmatrix} \\ \mathbf{J_{n-1,n}} &= \frac{1}{2}\begin{bmatrix} 1+\frac{q_n}{q_{n-1}} & 1-\frac{q_n}{q_{n-1}} \\ 1-\frac{q_n}{q_{n-1}} & 1+\frac{q_n}{q_{n-1}} \end{bmatrix}, \end{aligned} \tag{5}$$

where $\mathbf{P}_n$ is the propagation matrix that represents the traveling of waves in section n of length l_n, and $\mathbf{J_{n-1,n}}$ is the scattering matrix for the junction $(n, n+1)$. Note that $\mathbf{P}_n$ represents *filtered* wave propagation, and can not be easily simulated in the digital domain. The final matrix $\mathbf{M}$ that relates ψ-waves on the right side of the tube to ψ-waves on the left side, is calculated as a product of cascading sections:

$$\begin{aligned} \mathbf{M} &= \mathbf{P}_1 \cdot \mathbf{J}_{1,2} \cdot \mathbf{P}_2 \cdot \ldots \cdot \mathbf{J}_{n-1,n} \cdot \mathbf{P}_n \ldots \\ & \quad \ldots \cdot \mathbf{J}_{N-2,N-1} \cdot \mathbf{P}_{N-1} \cdot \mathbf{J}_{N-1,N} \cdot \mathbf{P}_N, \end{aligned} \tag{6}$$

where $q_0 = q_N = k$.

Incorporation of Losses

The effects of viscothermal losses can be included by using a 'lossy' wave number that varies with angular frequency ω:

$$k(\omega) = \frac{\omega}{\nu(\omega)} - j\,\alpha(\omega) \tag{7}$$

with sound velocity $\nu(\omega)$ and attenuation factor $\alpha(\omega)$, for which appropriate values can be found in most literature on acoustics (see, f.e., [9]). The losses due to the open-end radiation can be represented with the open-end reflectance $R(\omega)$. The final horn reflectance is then computed as:

$$R_f(\omega) = \frac{\mathbf{M}_{2,1} + \mathbf{M}_{2,2}\, R(\omega)}{\mathbf{M}_{1,1} + \mathbf{M}_{1,2}\, R(\omega)} \tag{8}$$

A suitable expression for $R(\omega)$ is given for spherical wavefronts by Causse et al. [3].

Digital Filter Approximation

It is necessary to approximate the reflection function by a low-order digital filter to render it feasible for real-time sound synthesis. It would be easiest to use an FIR filter, but since the impulse response corresponding to the reflectance of a flared tube is usually quite long, a large number of FIR filter coefficients would be needed and this would lead to an inefficient implementation. IIR filters are more complicated to design but they allow effective realization of long impulse responses with a small number of arithmetic operations. An IIR filter design method that allows separate weighting of specified magnitude and phase (group delay) has been developed by Deczky [7]. The method optimizes the poles $(r_{p,i}, \theta_{p,i})$ and zeros $(r_{o,i}, \theta_{o,i})$ of a cascade of second-order sections:

$$H(z) = k_0 \prod_{i=1}^{N} \frac{1 - 2r_{o,i}cos(\theta_{o,i})z^{-1} + r_{o,i}^2 z^{-2}}{1 - 2r_{p,i}cos(\theta_{p,i})z^{-1} + r_{p,i}^2 z^{-2}} \tag{9}$$

Iterative gradient-based techniques are applied to minimize a weighted sum of least-p errors over a discrete set of frequencies ω_k. The main disadvantage of this method is that good initial pole positions are required to avoid the algorithm from halting at local minima [8]. In practice, we found that restricting the parameter optimization entirely to either magnitude response or group delay strongly simplifies the choice of the initial parameters and improves the performance of the method. Hence a more robust procedure is to approximate the specified magnitude A_s and group delay τ_s with two separate filters. Once a suitable magnitude approximation filter $H_m(z)$ is found, the desired group delay for the second filter becomes :

$$\tau_d(\omega_k) = \tau_s(\omega_k) - \tau_m(\omega_k) \tag{10}$$

In order to ensure that the second filter does not boost or attenuate any frequencies, (9) is modified into the allpass filter:

$$H_a(z) = \prod_{i=1}^{N} \frac{r_i^2 - 2r_i cos(\theta_i)z^{-1} + z^{-2}}{1 - 2r_i cos(\theta_i)z^{-1} + r_i^2 z^{-2}} \qquad (11)$$

The following Least-square (LS) error norm was used to determine the coefficients of this filter:

$$L_\tau = \sum_{k=1}^{K} W_k \left[\tau_a(\omega_k) + \tau_0 - \tau_d(\omega_k)\right]^2 \qquad (12)$$

with weighting function W_k. The partial derivatives $\delta L_\tau / \delta r_i$ and $\delta L_\tau / \delta \theta_i$ can be expressed in simple closed form and are applied to find the direction towards the minimum error. The stability of the filter is guaranteed by restricting magnitude of each pole ($0 < r_i < 1$). At each iteration the nominal group delay τ_0 is optimized and forced to be an integer :

$$\tau_0 = trunc\left(\frac{\sum_{k=1}^{K} W_k \left[\tau_a(\omega_k) - \tau_d(\omega_k)\right]}{\sum_{k=1}^{K} W_k}\right) \qquad (13)$$

This way the procedure determines the number of delays that has to be added to or subtracted from the delay lines that represent the main bore (see figure 2). The fractionality of the delay is then also incorporated in the allpass filter. To avoid extra filters for the viscothermal losses of the main bore, these may be included into the bell reflectance computation.

Results and Implementation

The method was applied to a 54cm long Bessel horn with a bore profile described by:

$$r(x) = b\,(x + a)^e \qquad (14)$$

For $a = 1.05$cm, $b = 12.7$cm, and $e = -0.6$, equation (14) forms a good approximation of a trumpet bell profile. Note that the variables and parameters in equation (14) (except e) have to be expressed in cm. The corresponding horn function is calculated with cubic interpolation [6]. Figure 3 shows the impulse response of the horn. The response decays quite slowly and thus an FIR approximation would not be effective. Three second-order IIR sections were required to approximate the magnitude of the analogue response of the Bessel horn with an average accuracy of 0.25 dB. Here we used equal weighting of a LS error norm in a band of 2,5 KHz, with a sampling frequency of 44.1 KHz (see figure 4). A larger number of sections ($N = 5$) is needed for the allpass group delay design (see figure 5). Note that the group delay fit is good only for frequencies below cut-off. Using more sections did not improve the accuracy substantially. Fortunately the second-order allpass-sections are computationally efficient structures, which can be implemented using just 2 multiplications per section:

$$\begin{aligned} y(n) &= a_{2,i}\left[x(n) - y(n-2)\right] + x(n-2) \\ &\quad + a_{1,i}\left[x(n-1) - y(n-1)\right] \end{aligned} \qquad (15)$$

with coefficients $a_{1,i} - 2r_icos(\theta_i)$ and $a_{2,i} = r_i^2$. The total number of multiplications for this filter is $1 + 3 * 4 + 5 * 2 = 22$. This result is comparable to a conical section approximation with similar accuracy. With strategically chosen junction locations, about 10 sections are required for a strongly flared tube [3], and its DWM implementation would have $10 * 2$ multiplications, thereby neglecting the computational costs of any extra digital filters that would be required for implementation of fractional delay lengths and viscothermal losses.

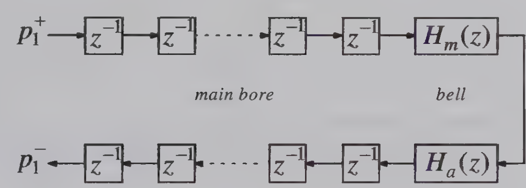

Figure 2: DWM simulation of wind instrument bore.

An LS FIR approximation corresponds to truncating the beginning of the impulse response and using that as the filter approximation. In order to approximate the impulse response of the Bessel horn an FIR filter would have about 300 coefficients corresponding to a duration of 6.8ms.

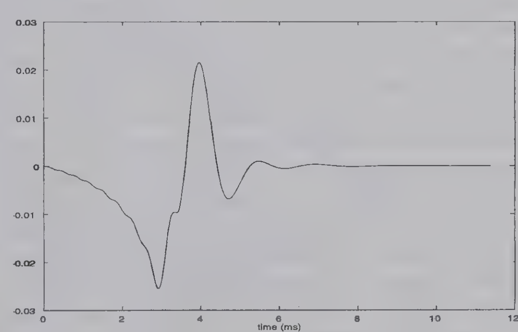

Figure 3: Calculated impulse response of the Bessel horn.

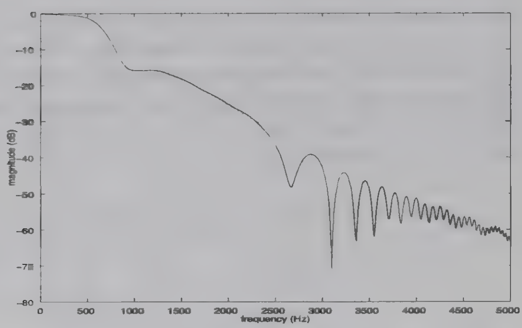

Figure 4: Comparison between the ideal magnitude response (solid) and the magnitude approximation filter (dotted).

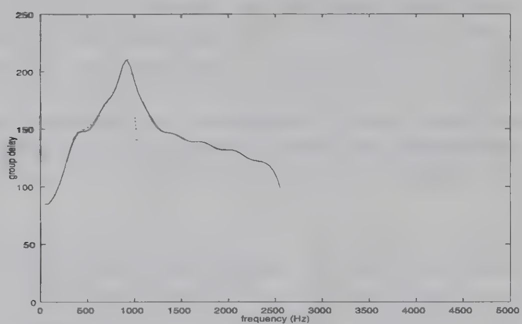

Figure 5: Comparison between the desired group delay (solid) and the group delay of the allpass filter (dotted).

Conclusion

A digital waveguide model of strongly flared acoustical tubes has been developed, including the effects of viscothermal and open-end radiation losses. All these aspects are 'lumped' in our model into two digital filters (one for magnitude and another for phase approximation). The system is designed to have good magnitude characteristics over the entire Nyquist band and good phase properties for those frequencies which are most strongly reflected. Formerly similar models have been realized using cylindrical and conical waveguides and fractional delay filters. The main advantages of the proposed modeling scheme are that (1) the model can be guaranteed to be stable by careful design of the digital filters (whereas conical waveguide filters are unstable in some cases) and (2) separate fractional delay filters that are computationally expensive are not needed. A minor disadvantage is the lack of parametrization since new digital filters need to be designed when the properties of the horn are changed. Fortunately, the geometry of the aircolumn of most musical horns is not changed during playing so the filters can be designed beforehand. Strongly flared tubes, such as the Bessel horn that we used as an example, have a long impulse response that is more efficiently modeled with IIR filters than FIR filters. By separating the magnitude and phase aspects of the IIR design procedure the phase approximation error can be guided into the less important high frequencies. This approach constitutes a structural improvement of the balance between accuracy, efficiency, and perceptual relevance of discrete-time models of horns and wind instrument bells.

References

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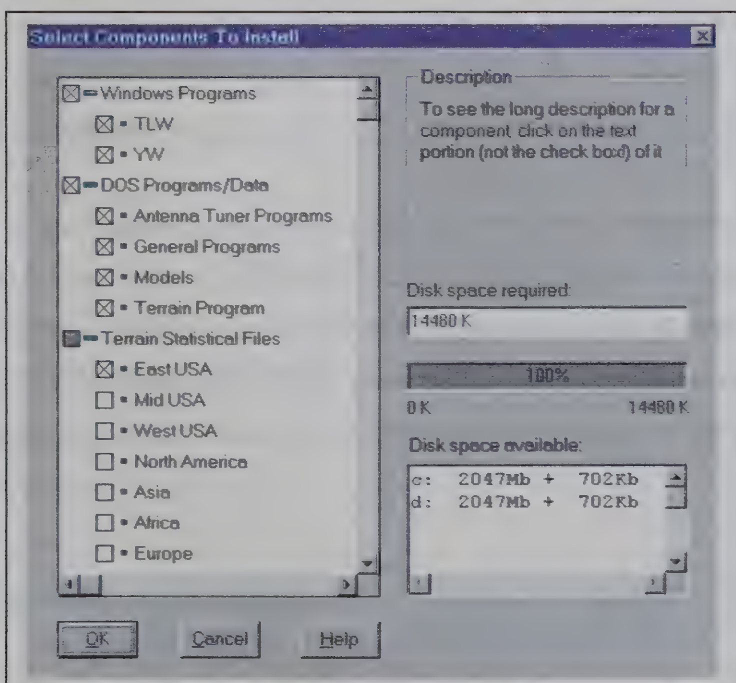
Instructions for Software/Data on Accompanying CD-ROM

The companion CD-ROM for the 19th Edition of *The ARRL Antenna Book* includes software associated with several areas of the book (to find descriptions of the programs in the book itself, look in the book index under "Programs:").

SOFTWARE INSTALLATION

To install the Antenna Book Software, do the following:

1. At the lower left-hand of your Desktop, click **Start**, then **Run**.
2. Click on the **Browse** button and then select the drive corresponding to your CD-ROM. We'll assume here that it is drive D.
3. Select the ***ABSETUP*** program by clicking on it twice and then clicking **OK**.
4. Follow the on-screen instructions to enter your name and company, to choose your target directory (the default is c:\AntBk19) and then Program Group.
5. When the menu tree "Select Components to Install" appears, select all the components you want. The installation program selects a number of default choices for you.



6. Select or de-select any choices you want and then click **OK** to start the installation.
7. Afterwards, allow the computer to shut down and reboot.

Possible Problems During Installation

You may possibly encounter warnings or problems during installation. Windows programs use DLLs (Dynamic Linked Libraries) and other files (such as OCX, ActiveX Controls) supplied from Microsoft, Compaq or other software manufacturers. Software manufacturers will occasionally update their DLLs and OCXs, which are usually stored as system files in the \Windows\System subdirectory.

If the installation program finds an older system file that should be updated, it may warn you that the file is currently in use. This might happen because that system file is being used either by Windows itself or by another program that is running in the background, such as an anti-virus program, for example. The installation program will give you the option of quitting the installation so that you can disable other programs and then run the installation again, or it will allow you to wait until the computer is next rebooted before updating the shared system file. The latter choice is the best solution, and you control this by clicking on the **Cancel** button, after which the installation will proceed.

The installation procedure overwrites older versions of DLLs and OCXs with the latest versions. It is normally best to allow this updating, since older programs that also use the same DLLs and OCXs should still work in other words, they should be backwards compatible. On very rare occasions, however, a newer DLL or OCX will not function with older programs. Should this occur, please contact the publisher of the other program or contact ARRL, using the e-mail address at the end of this document.

We have found that some auxiliary "Uninstall" programs can interact with an installation because certain "uninstall" programs automatically make DLLs and OCXs "read-only." Consult your operator's manual for such uninstall programs if you see a warning message about a "read-only" file during this installation. You will probably have to **Cancel** your installation and run the auxiliary uninstall program to update its file inventory. Then you can run the installation again.

Putting Icon(s) on Your Desktop

You may want to put the program group containing all the Antenna Book Software on your Desktop for easy access, or you may want to place an individual icon from the "Antenna Book Software" program group on your Desktop as an icon.

To place the entire "Antenna Book Software" **program group** on your Desktop, do the following:

1. From the Desktop Taskbar in Windows 95 or 98 at the lower left-hand corner of the screen, select **Start**, then **Programs**.
2. Scroll down to the bottom of the list by putting the mouse cursor over the down arrow to find the program *Windows Explorer*. Right-click on this program. If the window takes up the full screen, click on the Restore button at the top right of the screen to allow you to see the Desktop behind the *Windows Explorer* window. Now, move down to the **\Windows\Start Menu\Programs** subdirectory in the left-hand pane. While holding down the **Ctrl** and **Shift** keys on the keyboard together, hold down the left mouse button and drag the program group icon to your Desktop. Select **Create Shortcut** from the drop-down menu.

The procedure for putting a single program's icon on the Desktop is similar. In this case, you can drag the program icon you want, say the *TLW* icon, which will be located to either the left or right side after you have placed the mouse cursor over the Antenna Book Software program group.

Incidentally, if you'd like to alphabetize the program listings in the Program Group, click on **Start**, **Programs** and place the mouse cursor anywhere in the program listing. Right click the mouse and then choose **Sort by Name**.

DIRECTORY STRUCTURE

Although you may override it, the default subdirectory *ABSETUP* creates on your hard drive is C:\AntBk19, with 9 subdirectories beneath it:

\AntBk19\AntTuner

\AntBk19\BeaconWiz

\AntBk19\General

\AntBk19\GeoClock

\Antbk19\Models

\AntBk19\Terrain

\AntBk19\uninst

\AntBk19\XmsnLine

\AntBk19\Yagis

Listed below are short descriptions of the files in each subdirectory. Note that the "uninst" subdirectory holds the uninstall files. Leave these alone, please, so that you may uninstall the programs gracefully and completely, should you desire to do so in the future.

On the CD-ROM itself is located the **DOS_Only** subdirectory, which contains only PC-DOS executable files and data for those who are not yet running Windows 95/98/2000/NT operating systems.

In the \AntBk19*AntTuner* subdirectory:

AAT.EXE

The *AAT* program automatically evaluates antenna tuner networks over a very wide range of load impedances. You can use a word processing program to read the two output ASCII files. See Chapter 25 for more information on this program. An icon is automatically created in the Antenna Book Software program group for *AAT*. The documentation file is AAT.TXT or AAT.PDF.

In the \AntBk19*BeaconWiz* subdirectory:

Active Beacon Wizard ++

The setup file *ABWSetup.EXE* for the shareware *Active Beacon Wizard ++* program by Jim Tabor, KU5S, is located in this subdirectory. *Active Beacon Wizard ++* is usually installed automatically when you use the main installation program, *ABSETUP*, but you may re-install it using this program from **Start**, **Run** from your Desktop. Note that the icon for this program is placed on your Desktop, not in the Antenna Book Software program group. (Note also that in order to un-install *Active Beacon Wizard++* you must do so from **Start**, **Settings**, **Control Panel**, **Add/Remove Programs**.)

Active Beacon Wizard ++ can tell you when each beacon in the NCDXF network is active, and can also access internet time stations to set your computer's clock according to WWV. It can also retrieve propagation bulletins from numerous Web sources.

From the closing screen of *Active Beacon Wizard ++*: "We will donate 20% of all contributions to the NCDXF. http://www.ncdxf.org/. Your contribution will help us continue developing software for amateur radio and swl use." We urge you to contribute $10 to further the development of this useful and unique software.

In the *\AntBk19\General* subdirectory:

EFFLEN.FOR

EFFLEN.FOR is described in Chapter 2. It is an ASCII Fortran file that illustrates the principle behind the Schelkunoff tapering algorithm. This converts a tapered element into a single "monotaper" that can be modeled with a method-of-moments program like *NEC-2* or its derivatives. This is not a complete program, only a fragment of the core code used in the *YW* program.

GAMMA.BAS, GAMMA.EXE

GAMMA.BAS is described in Chapter 25. It is an ASCII text file that can be run in QBASIC or GWBASIC to compute the parameters for a gamma match. *GAMMA.EXE* is a compiled, executable file you can run directly from the DOS prompt or by clicking on the icon in the Antenna Book Software program group.

MOBILE.EXE

MOBILE.EXE is described in Chapter 6. This is a terrific DOS program by Leon Braskamp, AA6GL, for evaluating and designing mobile whip antennas and the coils used for loading these short antennas. You can access *MOBILE* by clicking on its icon in the Antenna Book Software program group.

LPCAD28.EXE

LPCAD28.EXE is described in Chapter 10. We thank Roger Cox, WBØDGF, who wrote this DOS program for computing LPDA designs. There is an icon for *LPCAD28* in the Antenna Book Software program group. Instructions for use of *LPCAD28* are in LPCAD.TXT (LPCAD.PDF).

ANTPLNR.PDF

This Adobe PDF document is titled "Antenna Height and Communications Effectiveness." It is subtitled *A Guide for City Planners and Amateur Radio Operators* and is written to help amateurs obtain building permits to put up their towers and antennas.

In the \AntBk19\GeoClock subdirectory:

GeoClock

This is where the program files for the shareware *GeoClock* program are located. An icon has been placed in the Antenna Book Software program group to access *GeoClock*, which is an innovative and useful program by Joe R Ahlgren. Using *GeoClock* you can determine the sunrise/sunset times for any location in the world for any date, as well as determine graphically the direction and distance between any two points. An icon is automatically created in the Antenna Book Software program group for *GeoClock*.

To quote from the GeoClock manual: "GeoClock is distributed as shareware. This means that if you use and enjoy the program, you are expected to register it." We urge you to register and support such innovative and useful software!

In the \AntBk19\Modeling Data subdirectory:

This subdirectory contains a number of *EZNEC* data files for antenna designs described in the book. These files are located in subdirectories below the *Models* subdirectory named after the chapters in printed version of *The ARRL Antenna Book*. Manually copy the files you are interested in modeling onto your hard disk and access them using *EZNEC*. Note that we do not include *EZNEC* with this book. You may purchase *EZNEC* from: Roy Lewallen, W7EL, PO Box 6658, Beaverton, OR 97007, or e-mail at w7el@eznec.com.

In the *\AntBk19\Terrain* subdirectory:

YT (Yagi Terrain analysis)

This subdirectory contains the *YT* program and sample terrain data for evaluating the effect of uneven local terrain on the launch of HF signals throughout the world. See YT.TXT (or YT.PDF) documentation file on disk. The program *YT* is described in detail in Chapter 3 and may be accessed using the icon in the Antenna Book Software program directory.

During the installation process you normally specify the region in which you live so that appropriate statistical elevation-angle files can be installed along with *YT*. The statistical elevation angles are computed for the full 11-year solar cycle from transmitting sites indicated by the filename.

If you like, you may copy statistical files for other areas of the world into this subdirectory using *ABSetup*. You will find, however, that the directory listing in *YT* for elevation files becomes rather cluttered if you carry this process too far.

The statistical files in the North American set are Alaska, Mexico, and VP2E. If you are in the USA, use the East-USA, Mid-USA or the West-USA file set. In Europe, use the Europe set; in Africa, use the Africa set, etc.

In the *\AntBk19\XmsnLine* subdirectory:

TLW (Transmission Line for Windows)

This subdirectory contains installation files for *TLW* (Transmission Line for Windows), plus the DOS program TLA.EXE, along with its documentation files TLA.TXT and TLA.PDF. *TLA.EXE* (short for Transmission Line, Advanced) computes many parameters for transmission lines and antenna tuners including detailed losses and stresses. If you have an older computer running DOS or Windows 3.x you would use *TLA.EXE*. Otherwise, you will want to run the *TLW* (Transmission Line for Windows) under Windows 95, 98, NT or 2000. An icon for *TLW* is created automatically in the Antenna Book Software program directory and the documentation file is TLW.PDF.

In the *\AntBk19\Yagis* subdirectory:

YW (Yagi for Windows)

In this subdirectory is located the *YW* (Yagi for Windows) program. Also included are 80+ optimized Yagi antenna designs. See YW.PDF for documentation. *YW* is described in Chapter 11. An icon is automatically created in the Antenna Book Software program group for *YW*.

The DOS program *BVYAGI.EXE* is also located in this subdirectory. It has similar functionality to *YW* (Yagi for Windows) but with a very sparse DOS interface. It is available for those who may not be running Windows 95 or a later version of the Windows operating system. The documentation file for *BVYAGI.EXE* is BVYAGI.TXT (or BVYAGI.PDF).

SCALE.EXE

Another useful DOS program called *SCALE.EXE* is located in this subdirectory, along with its documentation files SCALE.TXT and SCALE.PDF. This program uses the same Yagi data files used by *YW* to scale to different frequencies or different element taper schedules. An icon is automatically created in the Antenna Book Software program group for *SCALE*.

HF PROPAGATION TABLES

Summary HF propagation tables are located on the CD-ROM. Because of the size of all the data (almost 18 MB), you would not normally copy these files to your hard disk. There are 155 different QTHs represented in these files, organized according by continent (except for the large section dedicated to the USA).

Each set of tables for a particular location cover all 12 months of the year, for six different levels of solar activity, ranging from Very Low to Ultra High. The individual table sets are listed below.

Summary Propagation Tables

USA

W1B Boston, MA
W2A Albany, NY
W2N Buffalo, NY
W3D Washington, DC
W4A Montgomery, AL
W4F Miami, FL
W4G Atlanta, GA
W4K Louisville, KY
W4N Raleigh, NC
W4T Memphis, TN
W5A Little Rock, AR
W5H Houston, TX
W5L New Orleans, LA
W5M Jackson, MS
W5N Albuquerque, NM
W5O Oklahoma City, OK
W5T Dallas, TX
W6L Los Angeles, CA
W6S San Francisco, CA
W7A Phoenix, AZ
W7I Boise, ID
W7M Helena, MT
W7N Las Vegas, NV
W7O Portland, OR
W7U Salt Lake City, UT
W7W Seattle, WA
W7Y Cheyenne, WY
W8M Detroit, MI
W8O Cincinnati, OH
W8W Charleston, WV
W9C Chicago, IL
W9I Indianapolis, IN
W9W Milwaukee, WI
WØC Denver, CO
WØD Bismarck, ND
WØI Kansas City, MO
WØK Middle of US, KS
WØM St. Louis, MO
WØN Omaha, NE
WØS Pierre, SD

Other, North America

6Y Kingston, Jamaica
HP Panama City, Panama
KL7 Anchorage, Alaska
KP2 Virgin Islands
TI San Jose, Costa Rica
V3 Belmopan, Belize
VE1 Halifax, Nova Scotia
VE2 Montreal, Quebec
VE3 Toronto, Ontario
VE4 Winnipeg, Manitoba
VE5 Regina, Saskatchewan

VE6 Calgary, Alberta
VE7 Vancouver, British Columbia
VE8 Yellowknife, NWT
VO1 St. John's, Newfoundland
VP2 Anguilla
VP5 Turks & Caicos
XE1 Mexico City, Mexico
YVØ Aves Island

Europe

CT Lisbon, Portugal
DL Bonn, Germany
EA Madrid, Spain
EI Dublin, Ireland
F Paris, France
G London, England
I Rome, Italy
JW Svalbard
LA Oslo, Norway
OH Helsinki, Finland
OK Prague, Czech Republic
ON Brussels, Belgium
OZ Copenhagen, Denmark
UO Kishinev, Moldava
SV Athens, Greece
TA Ankara, Turkey
TF Reykjavik, Iceland
UA3 Moscow, Russia
UA6 Rostov, Russia
UB Kiev, Ukraine
YO Bucharest, Romania
YU Belgrade, Yugoslavia

South America

CE Santiago, Chile
CP La Paz, Bolivia
FY Cayenne, French Guiana
HC Quito, Ecuador
HC8 Galapagos Islands
HK Bogota, Columbia
LU Buenos Aires, Argentina
OA Lima, Peru
P4 Aruba
PY1 Rio de Janeiro, Brazil
PY0 Fernando de Noronha
YV Caracas, Venezuela
ZP Asuncion, Paraguay

Asia

1S Spratly Islands
3W Ho Chi Minh City, Vietnam
4S Columbo, Sri Lanka
4X Jerusalem, Israel
9N Katmandu, Nepal
AP Karachi, Pakistan
BY1 Beijing, China
BY4 Shanghai, China
BY0 Lhasa, China
HS Bangkok, Thailand
HZ Riyadh, Saudi Arabia
JA1 Tokyo, Japan
JA3 Osaka, Japan
JA8 Sapporo, Japan
JT Ulan Bator, Mongolia
UA9 Perm, Russia
UA0 Khabarovsk, Russia
UD Baku, Azerbaijan
UL7 Alma-Ata, Kazakh
VS6 Hong Kong
VU New Delhi, India
VU7 Andaman Islands
XZ Rangoon, Myanmar

Oceania

3D2 Fiji Islands
DU Manila, Philippines
FO Tahiti
H4 Honiara, Solomon Islands
KH0 Saipan, Mariana Islands
KH6 Honolulu, Hawaii
KH8 American Samoa
KX6 Kwajalein, Marshall Islands
VK2 Sydney, Australia
VK6 Perth, Australia
VK8 Darwin, Australia
YB Jakarta, Indonesia
ZL1 Aukland, New Zealand
ZL3 Christchurch, New Zealand

Africa

3B9 Rodrigues
3C Bata, Equatorial Guinea
5N Lagos, Nigeria
5R Antananarivo, Madagascar
5U Niamey, Niger Republic
5Z Nairobi, Kenya
6W Dakar, Senegal
7Q Lolongwe, Malawi
7X Algiers, Algeria
9J Lusaka, Zambia
9L Freetown, Sierra Leone
9X Kigali, Rwanda
C9 Maputo, Mozambique
CN Casablanca, Morroco
D2 Luanda, Angola
EA8 Canary Islands

J2 Djibouti	VQ9 Chagos, Diego Garcia	ZS6 Johannesburg, So.Africa
ST Khartoum, Sudan	XT Burkina Faso	
SU Cairo, Egypt	ZS1 Capetown, So. Africa	

These summary PDF files contain propagation prediction tables valid from the transmitting site indicated in the filename to seven generalized receiving locations throughout the world. The user selects a single transmitting site closest to his/her location. The easiest way to access this data is to open Adobe Reader and open the file **PropagationTables.PDF** in the root directory on your CD-ROM disk and choose "Summary Tables".

A sample set of a Detailed Propagation Table is also available for you to check out. From Adobe Reader open the file **PropagationTables.PDF** on your CD-ROM disk and choose "Sample Detailed Table" to see an example for Athens, Greece. A complete set of these detailed propagation tables are available on the CD-ROM version of *The ARRL Antenna Book*.

Each transmitting location is organized by six levels of solar activity over the whole 11-year solar cycle:

VL (Very Low: SSN between 0 to 20)
LO (Low: SSN between 20 to 40)
ME (Medium: SSN between 40 to 60)
HI (High: SSN between 60 to 100)
VH (Very High: SSN between 100 to 150)
UH (Ultra High: SSN greater than 150)

The seven generalized receiving locations throughout the world are:

EU = Europe (all of Europe)
FE = Far East (centered on Tokyo, Japan)
SA = South America (centered on Asuncion, Paraguay)
AF = Africa (centered on Lusaka, Zambia)
AS = southern Asia (centered on New Delhi, India)
OC = Oceania (centered on Sydney, Australia)
NA = North America (all of USA).

These propagation files show the highest predicted signal strength (in S-units) throughout the generalized receiving area, for a 1500-W transmitter and rather good antennas on both sides of the circuit. The standard antennas are 100-foot high inverted-V dipoles for 80 and 40 meters, a 3-element Yagi at 100 feet for 20 meters, and a 4-element Yagi at 60 feet for 15 and 10 meters.

Discount the S-Meter readings to reflect a smaller station:

Subtract 2 S units for a dipole instead of a Yagi

Subtract 3 S units for a dipole at 50 feet instead of a Yagi at 100 feet

Subtract 1 S unit for a dipole at 50 feet rather than a dipole at 100 feet

Subtract 3 S units for 100 W rather than 1500 W.

Shown below is a 1/3-size image of a table printout from San Francisco to the rest of the world, for Very High solar activity. The real image will be printed full-size in landscape mode if your printer is capable of this.

CA (San Francisco), Feb., for SSN = Very High, Sigs in S-Units. By N6BV, ARRL

	80 Meters							40 Meters							20 Meters							15 Meters							10 Meters							
UTC	EU	FE	SA	AF	AS	OC	NA	EU	FE	SA	AF	AS	OC	NA	EU	FE	SA	AF	AS	OC	NA	EU	FE	SA	AF	AS	OC	NA	EU	FE	SA	AF	AS	OC	NA	UTC
0	-	-	-	-	-	-	9+	3	-	5	5	-	-	9+	8	7	9+	9	7	9	9+	-	9	9+	9	6	9+	9+	-	9	9+	9	1	9	9+	0
1	-	-	2	-	-	-	9+	5	-	7	6	2	2	9+	8	8	9+	9	8	9+	9+	-	9	9+	9	8	9+	9+	-	9	9	8	6	9	9+	1
2	-	-	5	4	-	-	9+	6	-	8	7	2	6	9+	8	8	9+	9+	8	9+	9+	1	9	9+	9	8	9+	9+	-	9	9	2	7	9	9	2
3	3	-	6	5	-	3	9+	6	-	9	8	2	9	9+	8	9	9+	9	8	9+	9+	1	9	9	8	8	9+	9+	-	8	3	-	7	9	5	3
4	4	-	7	5	-	7	9+	7	1	9	8	-	9	9+	8	9	9+	9	8	9+	9+	1	8	9	2	6	9+	8	-	1	-	-	-	9	6	4
5	4	-	8	5	-	9	9+	8	3	9	8	-	9+	9+	7	9	9+	8	7	9+	9+	-	1	6	-	-	9+	6	-	-	-	-	-	5	6	5
6	1	-	8	5	-	9	9+	6	5	9	8	1	9+	9+	1	8	9+	8	1	9+	9+	-	-	6	-	-	9	6	-	-	-	-	-	-	6	6
7	2	1	6	1	-	9+	9+	7	7	9	8	2	9+	9+	4	1	9+	4	-	9+	9+	-	-	2	-	-	6	6	-	-	-	-	-	-	6	7
8	2	5	8	-	-	9+	9+	7	8	9	6	4	9+	9+	2	-	9+	8	-	9+	9+	-	-	3	-	-	1	6	-	-	-	-	-	-	6	8
9	2	6	8	-	-	9+	9+	7	9	9	4	5	9+	9+	1	-	9	8	-	9+	9+	-	-	3	-	-	-	6	-	-	-	-	-	-	6	9
10	2	7	8	-	-	9+	9+	7	9	9	1	5	9+	9+	-	1	9	2	-	9+	9+	-	-	1	-	-	-	6	-	-	-	-	-	-	6	10
11	2	7	7	-	-	9+	9+	7	9	9	-	6	9+	9+	-	6	7	-	-	9+	9+	-	-	-	-	-	-	6	-	-	-	-	-	-	5	11
12	2	7	6	-	1	9+	9+	7	9	8	-	6	9+	9+	-	6	2	-	-	9	9	-	-	-	-	-	1	6	-	-	-	-	-	-	5	12
13	2	8	2	-	2	9+	9+	6	9	7	-	7	9+	9+	-	4	9	2	-	9	9+	-	-	-	-	-	-	6	-	-	-	-	-	-	5	13
14	1	8	-	-	3	9+	9+	6	9	4	-	6	9+	9	5	-	9+	4	-	7	9+	-	-	9	2	-	-	9	-	-	-	-	-	-	5	14
15	-	7	-	-	1	9	9+	5	8	1	-	6	9	9+	8	-	9	7	5	8	9+	2	-	9	6	-	-	9+	-	-	9	4	-	-	9+	15
16	-	1	-	-	-	5	9+	2	8	-	-	3	9	9+	8	9	7	7	8	9	9+	8	-	9	8	1	5	9+	1	-	9+	8	-	-	9	16
17	-	-	-	-	-	-	9+	1	6	-	-	1	7	9+	7	9	2	7	6	9+	9+	8	6	8	8	4	9	9+	7	-	9	8	-	8	9+	17
18	-	-	-	-	-	-	9+	1	3	-	-	1	2	9+	6	8	1	6	5	9+	8	8	9	8	8	-	9+	9+	3	5	9	9	-	7	9+	18
19	-	-	-	-	-	-	9+	-	1	-	-	-	-	9+	6	6	1	5	5	9	8	6	8	8	8	-	9+	9+	-	3	9	9	-	9+	9+	19
20	-	-	-	-	-	-	9	-	-	-	-	-	-	9+	6	7	4	5	4	8	8	1	-	8	8	-	9	9+	-	-	9	9	-	9+	9+	20
21	-	-	-	-	-	-	9	-	-	-	-	-	-	9+	7	6	6	6	4	6	9	1	8	9	9	-	9	9+	-	-	9+	8	-	9	9+	21
22	-	-	-	-	-	-	9+	-	-	-	-	-	-	9+	6	5	8	8	5	6	9+	-	8	9	9	-	9	9+	-	8	9+	8	-	7	9+	22
23	-	-	-	-	-	-	9+	1	-	1	1	-	-	9+	7	5	9	9	6	6	9+	-	9	9+	9	1	9+	9+	-	8	9+	9	-	8	9+	23
	EU	FE	SA	AF	AS	OC	NA	EU	FE	SA	AF	AS	OC	NA	EU	FE	SA	AF	AS	OC	NA	EU	FE	SA	AF	AS	OC	NA	EU	FE	SA	AF	AS	OC	NA	

There are also a number of tables describing when the bands are open. These are located in the zipped file FIG6TAB.ZIP (also FIG6TAB.PDF). Use the ***Windows Explorer*** or ***WINZIP*** or **Acrobat Reader** to view these files, which are organized by US call sign area.

73,

Dean Straw, N6BV

Editor, *The ARRL Antenna Book*

ARRL, 225 Main Street

Newington, CT 06111

e-mail: n6bv@arrl.org

Federal Communications Commission

Latitude/Longitude Freq Results [ULS DATABASE]

Callsign / File Num	Status	Service	Station Class	Licensee Name	Xmtr City	Xmtr State	Frequency
/ 0001704427	Pending Level 2	IG	Base	ILLINOIS CENTRAL RAILROAD CO	CHICAGO	IL	160.92
/ 0001704427	Pending Level 2	IG	Mobile	ILLINOIS CENTRAL RAILROAD CO	CHICAGO	IL	160.92
/ 0001704427	Pending Level 2	IG	Base	ILLINOIS CENTRAL RAILROAD CO	CHICAGO	IL	161.19
/ 0001704427	Pending Level 2	IG	Mobile	ILLINOIS CENTRAL RAILROAD CO	CHICAGO	IL	161.19
/ 0001704427	Pending Level 2	IG	Base	ILLINOIS CENTRAL RAILROAD CO	CHICAGO	IL	161.46
/ 0001704427	Pending Level 2	IG	Mobile	ILLINOIS CENTRAL RAILROAD CO	CHICAGO	IL	161.46
KBY513	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	DES PLAINES	IL	160.455
KBY513	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	DES PLAINES	IL	160.77
KBY513	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	DES PLAINES	IL	160.89
KBY513	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	DES PLAINES	IL	161.04
KBY513	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	DES PLAINES	IL	161.175
KBY513	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	DES PLAINES	IL	161.52
KCN544	Active	IG	Mobile Relay	NATIONAL RAILROAD PASSENGER CORP	CHICAGO	IL	160.365
KDK344	Active	IG	Base	BELT RADIO COMMUNICATIONS INC	CHICAGO	IL	161.445
KFR786	Active	IG	Base	BELT RADIO COMMUNICATIONS INC	CHICAGO	IL	160.38
KFR786	Active	IG	Base	BELT RADIO COMMUNICATIONS INC	CHICAGO	IL	160.5

KFW518	Active	IG	Base	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	160.77
KFW518	Active	IG	Mobile	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	161.22
KFW519	Active	IG	Base	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	160.68
KFW519	Active	IG	Mobile Relay	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	160.68
KFW519	Active	IG	Mobile	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	161.22
KGU651	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	160.8
KGU651	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	161.055
KGU651	Active	IG	Mobile	PENNSYLVANIA LINES LLC	CHICAGO	IL	161.055
KGU651	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	161.07
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.23
KGV765 / 0001792630	Pending Level 2	IG	Base	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.38
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.38
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.41
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.44
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.455
KGV765 / 0001792630	Pending Level 2	IG	Base	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.5
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS	BEDFORD PARK	IL	160.5

				INC			
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.59
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.65
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.695
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.77
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.8
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.845
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.89
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.92
KGV765 / 0001792630	Pending Level 2	IG	Base	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.965
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.965
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	161.19
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	161.28
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	161.295
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	161.37
KGV765 / 0001792630	Pending Level 2	IG	Base	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	161.445

KGV765 / 0001792630	Pending Level 2	IG	Base	BELT RADIO COMMUNICATIONS INC	CHICAGO	IL	161.445
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	161.445
KGV765 / 0001792630	Pending Level 2	IG	Mobile	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	161.52
KJW633	Active	IG	Base	INDIANA HARBOR BELT RAILROAD	FRANKLIN PARK	IL	160.98
KLE810	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD COMPANY	CHICAGO	IL	160.92
KLE810	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD COMPANY	CHICAGO	IL	161.19
KLE810	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD COMPANY	CHICAGO	IL	161.295
KLE810	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD COMPANY	CHICAGO	IL	161.46
KLE810	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD COMPANY	CHICAGO	IL	161.505
KLR331	Active	IG	Base	Norfolk Southern Railway Company	CHICAGO	IL	160.485
KLR331	Active	IG	Mobile	Norfolk Southern Railway Company	CHICAGO	IL	160.485
KNDS965	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	CHICAGO	IL	160.335
KNDS965	Active	IG	Mobile	The Burlington Northern and Santa Fe Railway Company	CHICAGO	IL	160.335
KNDS965	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	CHICAGO	IL	161.1
KNDS965	Active	IG	Mobile	The Burlington Northern and Santa Fe Railway Company	CHICAGO	IL	161.1
KNDV569	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	CICERO	IL	160.335

KNDV569	Active	IG	Mobile	The Burlington Northern and Santa Fe Railway Company	CICERO	IL	160.335
KNDV569	Active	IG	Mobile Relay	The Burlington Northern and Santa Fe Railway Company	CICERO	IL	160.605
KNDV569	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	CICERO	IL	161.1
KNDV569	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	CICERO	IL	161.16
KNFX259	Active	IG	Base	Norfolk Southern Railway Company	CHICAGO	IL	160.44
KNFX259	Active	IG	Base	Norfolk Southern Railway Company	CHICAGO	IL	161.25
KNFX766	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP	CHICAGO	IL	160.23
KNFX766	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP	CHICAGO	IL	160.245
KNFX766	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP	CHICAGO	IL	160.305
KNFX766	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP	CHICAGO	IL	160.65
KNFX766	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP	CHICAGO	IL	160.74
KNFX766	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP	CHICAGO	IL	160.8
KNFX766	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP	CHICAGO	IL	160.92
KNFX766	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP	CHICAGO	IL	161.1
KNFX766	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP	CHICAGO	IL	161.19
KNFX766	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP	CHICAGO	IL	161.325
KNFX766	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP	CHICAGO	IL	161.37
KNHJ864	Active	IG	Base	GRAND TRUNK WESTERN RAILROAD	CHICAGO	IL	160.59
KNHJ864	Active	IG	Base	GRAND TRUNK WESTERN RAILROAD	CHICAGO	IL	160.845
KNIC661	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	161.37

KNIC661 / 0001721605	Pending Level 2	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	161.37
KNJM324	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	161.37
KQR394	Active	IG	Base	INDIANA HARBOR BELT RAILROAD	SUMMIT	IL	160.98
KRC498	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP DBA AMTRAK	CHICAGO	IL	160.74
KRC498	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP DBA AMTRAK	CHICAGO	IL	161.265
KRR917	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	CHICAGO	IL	160.92
KRR917	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	CHICAGO	IL	161.19
KRR917	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	CHICAGO	IL	161.28
KRR917	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	CHICAGO	IL	161.295
KRR917	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	CHICAGO	IL	161.46
KRR918	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	CHICAGO	IL	160.92
KRR918	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	CHICAGO	IL	161.19
KRR918	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	CHICAGO	IL	161.28
KRR918	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	CHICAGO	IL	161.295
KRR918	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	CHICAGO	IL	161.46
KSA223	Active	IG	Base	Norfolk Southern Railway Company	CHICAGO	IL	161.25
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.215
KSA357	Active	IG	Mobile	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.215
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	160.455
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.455
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.485

KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.5
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	160.575
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.575
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.71
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.815
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	160.89
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.89
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	161.04
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	161.04
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	161.07
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	161.175
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	161.175
KSA357	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	161.475
KSA357	Active	IG	Mobile	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	161.475
KSA569	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	CHICAGO	IL	160.65
KSA569	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	CHICAGO	IL	160.995
KSA950	Active	IG	Base	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	161.34
KSA950	Active	IG	Mobile	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	161.34
KSA993	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	CHICAGO	IL	161.1
KSA993	Active	IG	Base	The Burlington Northern and Santa Fe Railway	CHICAGO	IL	161.16

				Company			
KSD441	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.23
KSD441	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.275
KSD441	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.32
KSD441	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.785
KSD441	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.875
KSD441	Active	IG	Mobile	CSX TRANSPORTATION INC	CHICAGO	IL	160.875
KSD441 / 0001747070	Pending Level 2	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.23
KSD441 / 0001747070	Pending Level 2	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.275
KSD441 / 0001747070	Pending Level 2	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.32
KSD441 / 0001747070	Pending Level 2	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.785
KSD441 / 0001747070	Pending Level 2	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.875
KSD441 / 0001747070	Pending Level 2	IG	Mobile	CSX TRANSPORTATION INC	CHICAGO	IL	160.875
KSE225	Active	IG	Base	BELT RADIO COMMUNICATIONS INC	BEDFORD PARK	IL	160.965
KSE996	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	HODGKINS	IL	160.65
KSF754	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	CHICAGO	IL	160.65
KSF754	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	CHICAGO	IL	160.785
KTD335	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.23
KTD335	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.29
KTD335	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.32
KTD335	Active	IG	Mobile	CSX TRANSPORTATION INC	CHICAGO	IL	160.395

KTD335	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.785
KTD335	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.875
KTD335 / 0001728627	Pending Level 2	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.23
KTD335 / 0001728627	Pending Level 2	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.29
KTD335 / 0001728627	Pending Level 2	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.32
KTD335 / 0001728627	Pending Level 2	IG	Mobile	CSX TRANSPORTATION INC	CHICAGO	IL	160.395
KTD335 / 0001728627	Pending Level 2	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.785
KTD335 / 0001728627	Pending Level 2	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.875
KTI613	Active	IG	Base	INDIANA HARBOR BELT RAILROAD	FRANKLIN PARK	IL	161.07
KUS514	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.785
KUS514	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.875
KVK389	Active	IG	Base	Norfolk Southern Railway Company	CHICAGO	IL	161.415
KVK389	Active	IG	Mobile	Norfolk Southern Railway Company	CHICAGO	IL	161.415
KVK390	Active	IG	Base	Norfolk Southern Railway Company	CHICAGO	IL	160.515
KVK390	Active	IG	Mobile	Norfolk Southern Railway Company	CHICAGO	IL	160.515
KVM489	Active	IG	Base - Interconnect	The Burlington Northern and Santa Fe Railway Company	CHICAGO	IL	160.83
KVM489	Active	IG	Mobile Relay	The Burlington Northern and Santa Fe Railway Company	CHICAGO	IL	160.83
KVM489	Active	IG	Mobile	The Burlington Northern and Santa Fe Railway Company	CHICAGO	IL	161.385
KVU343	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP AMTRAK	CHICAGO	IL	160.305
KWS432	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	CICERO	IL	160.605

KWS432	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	CICERO	IL	160.8
KYN285	Active	IG	Base	INDIANA HARBOR BELT RAILROAD	CHICAGO RIDGE	IL	160.44
KYN285	Active	IG	Base	INDIANA HARBOR BELT RAILROAD	CHICAGO RIDGE	IL	160.77
KYN285	Active	IG	Base	INDIANA HARBOR BELT RAILROAD	CHICAGO RIDGE	IL	160.98
KYN285	Active	IG	Base	INDIANA HARBOR BELT RAILROAD	CHICAGO RIDGE	IL	161.07
WNAE990	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	DOWNERS GROVE	IL	161.1
WNAE990	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	DOWNERS GROVE	IL	161.16
WNBG753	Active	IG	Base	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	160.605
WNBG753	Active	IG	Mobile	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	160.605
WNBG753	Active	IG	Mobile	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	161.205
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.23
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	160.455
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.455
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.5
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	160.575
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.575
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.59
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.77
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	160.89

WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.89
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	160.98
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	161.04
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	161.04
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	161.07
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	161.175
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	161.175
WNDL300	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	NORTHLAKE	IL	161.475
WNHL632	Active	IG	Base	CHICAGO CENTRAL & PACIFIC RAILROAD	CICERO	IL	160.755
WNIA323	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	160.545
WNIA323	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	160.56
WNIA323	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	160.8
WNIA323	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	160.86
WNIA323	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	161.07
WNIZ346	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	CHICAGO	IL	160.92
WNIZ346	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	CHICAGO	IL	161.19
WNJS224	Active	IG	Base	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	160.605
WNJS224	Active	IG	Mobile	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	160.605
WNJY220	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	STICKNEY	IL	160.92
WNJY220	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	STICKNEY	IL	161.19
WNJY220	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	STICKNEY	IL	161.205

WNJY220	Active	IG	Base	ILLINOIS CENTRAL GULF RAILROAD CO	STICKNEY	IL	161.295
WNKX352	Active	IG	Base	Norfolk Southern Railway Company	CHICAGO	IL	160.44
WNKX352	Active	IG	Base	Norfolk Southern Railway Company	CHICAGO	IL	160.545
WNKX352	Active	IG	Mobile	Norfolk Southern Railway Company	CHICAGO	IL	160.545
WNKX352	Active	IG	Mobile Relay	Norfolk Southern Railway Company	CHICAGO	IL	160.545
WNKX352	Active	IG	Base	Norfolk Southern Railway Company	CHICAGO	IL	160.62
WNKX352	Active	IG	Base	Norfolk Southern Railway Company	CHICAGO	IL	160.8
WNKX352	Active	IG	Mobile	Norfolk Southern Railway Company	CHICAGO	IL	161.205
WNKX352	Active	IG	Base	Norfolk Southern Railway Company	CHICAGO	IL	161.25
WNLF924	Active	IG	Base	CHICAGO CENTRAL & PACIFIC RAILROAD CO	CICERO	IL	160.755
WNLF924	Active	IG	Base	CHICAGO CENTRAL & PACIFIC RAILROAD CO	CICERO	IL	161.19
WNMM986	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	160.23
WNMM986	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	160.455
WNMM986	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	160.485
WNMM986	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	160.575
WNMM986	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	160.89
WNMM986	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	161.04
WNMM986	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	161.07
WNMM986	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	161.175
WNMM986	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	161.52
WNMV660	Active	IG	Base	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	161.025
WNMY439	Active	IG	Base	GRAND TRUNK WESTERN RAILROAD	CHICAGO	IL	160.53

WNMY439	Active	IG	Base	GRAND TRUNK WESTERN RAILROAD	CHICAGO	IL	160.59
WNMY439	Active	IG	Base	GRAND TRUNK WESTERN RAILROAD	CHICAGO	IL	160.845
WNMY439	Active	IG	Base	GRAND TRUNK WESTERN RAILROAD	CHICAGO	IL	160.95
WNMY441	Active	IG	Base	GRAND TRUNK WESTERN RAILROAD	CHICAGO	IL	160.53
WNMY441	Active	IG	Base	GRAND TRUNK WESTERN RAILROAD	CHICAGO	IL	160.59
WNMY441	Active	IG	Base	GRAND TRUNK WESTERN RAILROAD	CHICAGO	IL	160.845
WNMY441	Active	IG	Base	GRAND TRUNK WESTERN RAILROAD	CHICAGO	IL	160.95
WNPO573	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	LEMONT	IL	160.65
WNQU482	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	160.8
WNQU573	Active	IG	Base	Northeast Illinois Regional Commuter Railroad Corp	CHICAGO	IL	160.44
WNUI971	Active	IG	Base	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	161.025
WNUY884	Active	IG	Mobile Relay	Norfolk Southern Railway Company	CHICAGO	IL	160.365
WNUY884	Active	IG	Mobile	Norfolk Southern Railway Company	CHICAGO	IL	161.445
WNVF806	Active	IG	Base	Northeast Illinois Regional Commuter Railroad Corporation	CHICAGO	IL	161.52
WNWV511	Active	IG	Base	GRAND TRUNK WESTERN RAILROAD	CHICAGO	IL	160.905
WNXK890	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	CHICAGO	IL	161.1
WPAS786	Active	IG	Base	Soo Systems Radio Communications Corporation	SCHILLER PARK	IL	161.145
WPAS786	Active	IG	Mobile	Soo Systems Radio Communications Corporation	SCHILLER PARK	IL	161.145
WPAS786	Active	IG	Base	Soo Systems Radio Communications Corporation	SCHILLER PARK	IL	161.43

WPCT556	Active	IG	Base	NATIONAL RAILROAD PASSENGER CORP	CHICAGO	IL	160.305
WPEQ606	Active	IG	Mobile	The Burlington Northern and Santa Fe Railway Company		IL	160.38
WPEQ606	Active	IG	Mobile	The Burlington Northern and Santa Fe Railway Company		IL	160.5
WPEQ606	Active	IG	Mobile	The Burlington Northern and Santa Fe Railway Company		IL	160.965
WPFK523	Active	IG	Base	The Burlington Northern and Santa Fe Railway Co	HODGKINS	IL	160.65
WPFK523	Active	IG	Mobile	The Burlington Northern and Santa Fe Railway Co	HODGKINS	IL	160.65
WPFK523	Active	IG	Base	The Burlington Northern and Santa Fe Railway Co	HODGKINS	IL	160.995
WPFK523	Active	IG	Mobile	The Burlington Northern and Santa Fe Railway Co	HODGKINS	IL	160.995
WPFK523	Active	IG	Base	The Burlington Northern and Santa Fe Railway Co	HODGKINS	IL	161.205
WPFK523	Active	IG	Mobile	The Burlington Northern and Santa Fe Railway Co	HODGKINS	IL	161.205
WPFZ208	Active	IG	Base	NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD CORPORATION	CHICAGO	IL	160.605
WPGP395	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	160.44
WPGP395	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	160.755
WPGP395	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	160.8
WPGP395	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	160.86
WPGP395	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	160.89
WPGP395	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	160.98
WPGP395	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	161.07
WPGP395	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	161.1
WPGP395	Active	IG	Base	PENNSYLVANIA LINES LLC	CHICAGO	IL	161.295

WPGQ627	Active	IG	Mobile	The Burlington Northern and Santa Fe Railway Company		IL	160.65
WPGQ627	Active	IG	Mobile	The Burlington Northern and Santa Fe Railway Company		IL	161.01
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	160.395
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	160.47
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	160.5
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	160.515
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	160.59
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	160.62
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	160.77
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	160.98
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	161.085
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	161.145
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	161.19
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	161.205
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	161.235

WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	161.43
WPMZ858	Active	IG	Base	Soo Systems Radio Communications Corporation	FRANKLIN PARK	IL	161.52
WPPA494	Active	IG	Base	Soo Systems Radio Communications Corporation	CHICAGO	IL	160.77
WPPA494	Active	IG	Base	Soo Systems Radio Communications Corporation	CHICAGO	IL	161.085
WPPA494	Active	IG	Base	Soo Systems Radio Communications Corporation	CHICAGO	IL	161.43
WPPA494	Active	IG	Base	Soo Systems Radio Communications Corporation	CHICAGO	IL	161.52
WPPC243	Active	IG	Base	UNION PACIFIC RAILROAD COMPANY	CHICAGO	IL	160.575
WPRK560	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.23
WPRK560	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.32
WPRK560	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO	IL	160.785
WPRK561	Active	IG	Base	CSX TRANSPORTATION INC	ALSIP	IL	160.23
WPRK561	Active	IG	Base	CSX TRANSPORTATION INC	BEDFORD PARK	IL	160.23
WPRK561	Active	IG	Base	CSX TRANSPORTATION INC	BRIDGEVIEW	IL	160.23
WPRK561	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO RIDGE	IL	160.23
WPRK561	Active	IG	Base	CSX TRANSPORTATION INC	ALSIP	IL	160.29
WPRK561	Active	IG	Base	CSX TRANSPORTATION INC	BEDFORD PARK	IL	160.29
WPRK561	Active	IG	Base	CSX TRANSPORTATION INC	BRIDGEVIEW	IL	160.29
WPRK561	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO RIDGE	IL	160.29
WPRK561	Active	IG	Base	CSX TRANSPORTATION INC	ALSIP	IL	160.785

WPRK561	Active	IG	Base	CSX TRANSPORTATION INC	BEDFORD PARK	IL	160.785
WPRK561	Active	IG	Base	CSX TRANSPORTATION INC	BRIDGEVIEW	IL	160.785
WPRK561	Active	IG	Base	CSX TRANSPORTATION INC	CHICAGO RIDGE	IL	160.785
WPRL451	Active	IG	Mobile	CSX INTERMODAL	BEDFORD PARK	IL	160.275
WPRL451	Active	IG	Mobile Relay	CSX INTERMODAL	BEDFORD PARK	IL	160.275
WPTX382	Active	IG	Mobile	National Railroad Passenger Corporation, dba AMTRAK	CHICAGO	IL	160.395
WPTX382	Active	IG	Base	National Railroad Passenger Corporation, dba AMTRAK	CHICAGO	IL	161.325
WPUX596	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	NAPERVILLE	IL	161.1
WPWX313	Active	IG	Base	Northeast Illinois Regional Commuter Railroad Corporation	Chicago	IL	160.605
WPWX313	Active	IG	Base	Northeast Illinois Regional Commuter Railroad Corporation	Wooddale	IL	160.605
WPWX313	Active	IG	Mobile	Northeast Illinois Regional Commuter Railroad Corporation	Chicago	IL	160.605
WPWY559	Active	IG	Base	NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD CORP	CHICAGO	IL	161.025
WPWY559	Active	IG	Mobile	NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD CORP	CHICAGO	IL	161.025
WPYE856	Active	IG	Base	Soo System Radio Communications Corporation	Bensenville	IL	160.485
WPYE856	Active	IG	Mobile	Soo System Radio Communications Corporation	Bensenville	IL	160.485
WPYE856	Active	IG	Base	Soo System Radio Communications Corporation	Bensenville	IL	160.62
WPYE856	Active	IG	Mobile	Soo System Radio Communications Corporation	Bensenville	IL	160.62

WPYE856	Active	IG	Base	Soo System Radio Communications Corporation	Bensenville	IL	160.77
WPYE856	Active	IG	Mobile	Soo System Radio Communications Corporation	Bensenville	IL	160.77
WPYE856	Active	IG	Base	Soo System Radio Communications Corporation	Bensenville	IL	161.085
WPYE856	Active	IG	Mobile	Soo System Radio Communications Corporation	Bensenville	IL	161.085
WPYE856	Active	IG	Mobile	Soo System Radio Communications Corporation	Bensenville	IL	161.37
WPYE856	Active	IG	Base	Soo System Radio Communications Corporation	Bensenville	IL	161.43
WPYE856	Active	IG	Mobile	Soo System Radio Communications Corporation	Bensenville	IL	161.43
WPYE856	Active	IG	Base	Soo System Radio Communications Corporation	Bensenville	IL	161.52
WPYE856	Active	IG	Mobile	Soo System Radio Communications Corporation	Bensenville	IL	161.52
WPYE978	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	Hodgkins	IL	160.65
WPYE978	Active	IG	Base	The Burlington Northern and Santa Fe Railway Company	Hodgkins	IL	160.995
WPZI679	Active	IG	Base	CSX Transportation Inc	CHICAGO	IL	160.23
WPZI679	Active	IG	Base	CSX Transportation Inc	CHICAGO	IL	160.29
WPZI679	Active	IG	Base	CSX Transportation Inc	CHICAGO	IL	160.32
WPZI679	Active	IG	Base	CSX Transportation Inc	CHICAGO	IL	160.785
WQAG471	Active	IG	Base	Wiconsin Central System	Desplaines	IL	161.295
WQAG471	Active	IG	Mobile	Wiconsin Central System	Desplaines	IL	161.295
WQL816	Active	IG	Mobile Relay	The Burlington Northern and Santa Fe Railway Company	DOWNERS GROVE	IL	160.425
WQL816	Active	IG	Mobile	The Burlington Northern and Santa Fe Railway Company	DOWNERS GROVE	IL	160.935

336 Row(s) were Retrieved

Table of Contents | Help

If you have suggestions for improvements to this application,
please submit a technical support request or call (202) 414-1250.

General Menu Reporting System

Licensee: NATIONAL RAILROAD PASSENGER CORP

ATTN AMTRAK RADIO ENGINEERING
NATIONAL RAILROAD PASSENGER CORP
30TH ST STATION BOX 41
PHILADELPHIA, PA 19104

FCC Registration Number (FRN): 0002159770

Call Sign: KNFX766 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
05/24/2002	05/24/2002	06/30/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 1400 S LUMBER ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-51-50.1 N **Long (NAD83):** 087-38-13.2 W **ASR No.:** **Ground Elev:** 180.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.23000	FB	1	0	20K0F3E	10.000		9.0		
1	1	160.24500	FB	1	0	20K0F3E	10.000		9.0		
1	1	160.30500	FB	1	0	20K0F3E	10.000		9.0		
1	1	160.65000	FB	1	0	20K0F3E	10.000		9.0		
1	1	160.74000	FB	1	0	20K0F3E	10.000		9.0		
1	1	160.80000	FB	1	0	20K0F3E	10.000		9.0		
1	1	160.92000	FB	1	0	20K0F3E	10.000		9.0		
1	1	161.10000	FB	1	0	20K0F3E	10.000		9.0		
1	1	161.19000	FB	1	0	20K0F3E	10.000		9.0		
1	1	161.32500	FB	1	0	20K0F3E	10.000		9.0		
1	1	161.37000	FB	1	0	20K0F3E	10.000		9.0		

Control Points **Pt. No.**1
Address: 1400 S LUMBER ST
City: CHICAGO **County:** **State:** IL **Telephone Number:** (215)349-4000

ONLINE RAILFAN TIMETABLE

UNION PACIFIC

Milwaukee Subdivision

Former Chicago and North Western main freight line from Proviso Yard to Milwaukee.

Radio Frequency - 161.040 (AAR Channel 62)

Stations/Milepost Locations

Direction is northward from Proviso to St. Francis
Distance is from Proviso

0.0 Proviso
2.6 Grand Avenue
7.4 Bryn Mawr (CP junction/remote-CP-Tower B-17)
7.8 Elk Grove
10.9 Norma (UP junction/remote-Deval)
12.0 Deval (tower-UP/WC crossing)
17.5 Shermer (CP junction)
21.2 Valley (UP junction)
23.8 Blodgett
29.7 KO (UP junction)
31.9 Upton (EJ&E crossing/automatic interlocking)
35.7 Park City
38.2 Gurnee
49.5 Pleasant Prairie
51.7 Bain
61.2 Waxdale
65.5 Kay
76.6 Airport
78.4 Layton Ave.
80.1 St. Francis (UP junction)

Proviso to KO - 2 tracks, signalled for normal left hand operation.

KO to St. Francis - 1 track. Track Warrants in use with automatic block signals. 2 track segments Park City to Gurnee. Airport to St. Francis.

Automotive

Automotive Train Network

Union Pacific has a network of Automotive trains to minimize time for your business. This network is supplemented by other train networks to ensure timely delivery across our system. Below is a list of our current Automotive Network.

Train Symbol	Origin	Termination
AARIN	Arlington, TX	St. Elmo, IL
AASEW	Valley Junction, IL	Englewood, TX
AASFX	Valley Junction, IL	Fairfax, KS
ABEPR	Belvidere, IL	Proviso, IL
ADAEG	Miller, TX	Eagle Pass, TX
ADEWF	Salem, IL	Westfield, TX
AFXAS	Fairfax, KS	Valley Junction, IL
AGFSH	Griffith, IN	Reisor, LA
AGPDC	Galena Park, TX	Valley Junction, IL
AHKBA	Hinkle, OR	Barnes Yard, OR
AJAPR	Janesville, WI	Proviso, IL
AKCGP	Kansas City, MO	Galena Park, TX
AKCMQ	Kansas City, MO	Mesquite, TX
AKSBE	Armourdale, KS	Oakland, CA
AKSML	Armourdale, KS	Mira Loma, CA
AKSNP	Armourdale, KS	North Platte West, NE
AKSPX	Armourdale, KS	Phonix, AZ
ALDAS	Port Laredo, TX	Valley Junction, IL
ALDES	Port Laredo, TX	East St. Louis, IL
ALDLI	Port Laredo, TX	Livonia, LA
AMLKS	Mira Loma, CA	Eightenst, KS
AMLKSB	Mira Loma, CA	Eightenst, KS
AMQDC	Mesquite, TX	Valley Junction, IL
ANPDV	North Platte West, NE	Denver, CO
ANPLA	North Platte West, NE	Los Angeles, CA
ANPMI	North Platte West, NE	Milpitas, CA
ANPML	North Platte West, NE	Mira Loma, CA
ANPRO	North Platte West, NE	Roper, UT
ANPSE	North Platte West, NE	Seattle, WA
AOAKSB	Oakland, CA	Eightenst, KS
APRBE	Proviso, IL	Belvidere, IL
APRJA	Proviso, IL	Janesville, WI
APRNP	Proviso, IL	North Platte West, NE

PRNPB	Proviso, IL	North Platte West, NE
PXKS	Phoenix, AZ	Eightenst, KS
SENP	Seattle, WA	North Platte East, NE
SHAS	Shreveport, LA	Valley Junction, IL
[illegible]V	Spring, TX	Brownsville, TX
SPEG	Spring, TX	Eagle Pass, TX
WSNP	Warm Springs, CA	North Platte East, NE
YCMX	Yard Center, IL	Laredo--International Bridge, TX

Intermodal

Intermodal Facilities Maps

Global 2, Illinois

Terminal Information

Location: 301 W. Lake St. Northlake, IL 60164

Terminal Capabilities: TOFC/COFC

Directions: From the South or East: take the Lake Street (US20) East exit off I-290; proceed east 1/4 mile to bottom of the hill; turn right onto Hurbert Dr. (in between the two overpasses) and proceed 1/3 of mile to intermodal gate complex.

Fax: (708) 649-5405

Hours of Operation: 7 Days, 24 Hours

National Customer Service Center
Intermodal Phone.....800-877-5123
Intermodal Fax.....800-228-9615

Schedule Information
View current schedule information for this and other selected origination terminals.
(Requires User ID and password)

Downloading Guide

ONLINE RAILFAN TIMETABLE

UNION PACIFIC

Milwaukee Subdivision

Former Chicago and North Western main freight line from Proviso Yard to Milwaukee.

Radio Frequency - 161.040 (AAR Channel 62)

Stations/Milepost Locations

Direction is northward from Proviso to St. Francis
Distance is from Proviso

0.0 Proviso
2.6 Grand Avenue
7.4 Bryn Mawr (CP junction/remote-CP-Tower B-17)
7.8 Elk Grove
10.9 Norma (UP junction/remote-Deval)
12.0 Deval (tower-UP/WC crossing)
17.5 Shermer (CP junction)
21.2 Valley (UP junction)
23.8 Blodgett
29.7 KO (UP junction)
31.9 Upton (EJ&E crossing/automatic interlocking)
35.7 Park City
38.2 Gurnee
49.5 Pleasant Prairie
51.7 Bain
61.2 Waxdale
65.5 Kay
76.6 Airport
78.4 Layton Ave.
80.1 St. Francis (UP junction)

Proviso to KO - 2 tracks, signalled for normal left hand operation.

KO to St. Francis - 1 track, Track Warrants in use with automatic block signals. 2 track segments Park City to Gurnee, Airport to St. Francis.

Chica[illegible] & North Western

160.890 -- [AAR channel 52] -- channel 1 (road)
160.455 -- [AAR channel 23] -- channel 2 (MOW, diesel ramp)
161.040 -- [AAR channel 62] -- channel 3 (road, commuter)
161.175 -- [AAR channel 71] -- channel 4 (yard, piggyback ramp)
160.575 -- [AAR channel 31] -- channel 5 (yard)
161.475 -- [AAR channel 91] -- channel 6 (Proviso hump yardmaster)
160.485 -- [AAR channel 25] -- police
161.205 -- [AAR channel 73] -- police

Amtrak

160.845 -- [AAR channel 49] -- Auto Train operations
161.550 -- [AAR channel 96] -- Auto Train switching
161.265 -- [AAR channel 77] -- carmen
160.920 -- [AAR channel 54] -- channel 1 (Northeast Corridor road)
161.325 -- [AAR channel 81] -- MOW
160.305 -- [AAR channel 13] -- passenger services
160.635 -- [AAR channel 35] -- Philadelphia-Harrisburg road
161.280 -- [AAR channel 78] -- shop switcher
160.545 -- [AAR channel 29] -- special agents
160.650 -- [AAR channel 36] -- Sunnyside Yard, New York
161.445 -- [AAR channel 89] -- yard (Bear, DE)
160.740 -- [AAR channel 42] -- yard (Chicago)

Licensee: NATIONAL RAILROAD PASSENGER CORP

FCC Registration Number (FRN):
0002159770

Call Sign: KCN544
File Number:

ATTN AMTRAK RADIO ENGINEERING
NATIONAL RAILROAD PASSENGER CORP
30TH ST STATION BOX 41
PHILADELPHIA, PA 19104

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
06/18/2002	06/18/2002	07/30/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** UNION STA 210 S CANAL ST

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-52-43.1 N **Long (NAD83):** 087-38-18.2 W **ASR No.:** **Ground Elev:** 181.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.36500	FB2	1	0	20K0F3E	75.000	146.000	122.0		

Control Points **Pt. No.**1

Address: AMTRAK POLICE OFC UNION STA

City: CHICAGO **County:** **State:** IL **Telephone Number:** (312)930-4284

Licensee: BELT RADIO COMMUNICATIONS INC

FCC Registration Number (FRN):
0003932977

Call Sign: KDK344

File Number:

ATTN RUTH A TAYLOR
BELT RADIO COMMUNICATIONS INC
6900 S CENTRAL AVE
CHICAGO, IL 60638

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
01/18/2001	01/18/2001	02/01/2011	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 68TH & LAVERGNE AVE

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-46-19.1 N **Long (NAD83):** 087-44-32.2 W **ASR No.:** **Ground Elev:**

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.44500	FB	1	0	20K0F3E	60.000		38.0		

Control Points Pt. No.1

Address: 68TH & LAVERGNE AVE

City: CHICAGO **County:** **State:** IL **Telephone Number:** (708)496-4108

Licensee: PENNSYLVANIA LINES LLC

FCC Registration Number (FRN): 0004142501

Call Sign: KFB399 **File Number:**

ATTN HAROLD P GUESS
PENNSYLVANIA LINES LLC
99 SPRING ST SW BOX 123
ATLANTA, GA 30303

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
06/10/2003	06/10/2003	08/26/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** CR COLEHOUR YD 106TH ST & INDPLS BLVD

City: HAMMOND **County:** LAKE **State:** IN

Lat (NAD83): 41-42-09.1 N **Long (NAD83):** 087-31-28.2 W **ASR No.:** N/A **Ground Elev:** 174.0

Loc. 2 **Area of Operation**
Operating within a 40.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.54500	FB	1	0	20K0F3E	60.000	68.000	20.0		
1	1	160.56000	FB	1	0	20K0F3E	60.000	68.000	20.0		
1	1	160.80000	FB	1	0	20K0F3E	60.000	68.000	20.0		
1	1	160.86000	FB	1	0	20K0F3E	60.000	68.000	20.0		
1	1	161.07000	FB	1	0	20K0F3E	60.000	68.000	20.0		
1	1	161.13000	FB2	1	0	20K0F3E	60.000	68.000	20.0		
2	1	160.71000	MO	5	0	20K0F3E	65.000				

Control Points **Pt. No.**1

Address: CR COLEHOUR YD 106TH ST & INDPLS BLVD

City: HAMMOND **County:** **State:** IN **Telephone Number:** (218)296-2344

Licensee: BELT RADIO COMMUNICATIONS INC

FCC Registration Number (FRN):
0003932977

Call Sign: KFR786

File Number:

ATTN TIMOTHY E COFFEY
BELT RADIO COMMUNICATIONS INC
6900 S CENTRAL AVENUE
CHICAGO, IL 60638-6312

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
12/03/2002	12/03/2002	12/02/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 690 S CENTRAL AVE

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-46-09.1 N **Long (NAD83):** 087-45-40.2 W **ASR No.:** **Ground Elev:** 188.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.38000	FB	1	0	16K0F3E	40.000	10.000	41.0		
1	1	160.50000	FB	1	0	16K0F3E	40.000	10.000	41.0		

Control Points **Pt. No.1**

Address: DISPATCHERS OFFICE DIESEL SHOP OFFICE DIESEL SHOP OFFICE 6900 S CENTRAL AVE

City: CHICAGO **County:** **State:** IL **Telephone Number:** (708)496-4033

Licensee: Northeast Illinois Regional Commuter Railroad Corporation

ATTN Director of Communications
Northeast Illinois Regional Commuter Railroad Corporation
547 W. Jackson Blvd.
CHICAGO, IL 60661-5717

FCC Registration Number (FRN):
0002849818

Call Sign: KFW518

File Number:

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
08/23/2003	08/23/2003	11/19/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 2801 W GRAND AVE
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-53-34.1 N **Long (NAD83):** 087-41-38.2 W **ASR No.:** N/A **Ground Elev:** 182.0

Loc. 3 **Address:** 1301 N MILWAUKEE AVE
City: LIBERTYVILLE **County:** LAKE **State:** IL
Lat (NAD83): 42-17-47.1 N **Long (NAD83):** 087-57-32.3 W **ASR No.:** **Ground Elev:** 216.0

Loc. 4 **Address:** BARTLETT RD & ELROY AVE
City: BARLETTE **County:** COOK **State:** IL
Lat (NAD83): 41-59-33.1 N **Long (NAD83):** 088-10-56.3 W **ASR No.:** N/A **Ground Elev:** 244.0

Loc. 5 **Address:** 1100 FT NE OF 135TH & SW HWY
City: ORLAND PARK **County:** COOK **State:** IL
Lat (NAD83): 41-38-52.1 N **Long (NAD83):** 087-50-32.2 W **ASR No.:** **Ground Elev:** 213.0

Loc. 6 **Address:** 250 N LAKE ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-53-09.1 N **Long (NAD83):** 087-38-18.2 W **ASR No.:** N/A **Ground Elev:** 181.0

Loc. 7 **Address:** 109 W LAKE ST
City: ELGIN **County:** KANE **State:** IL
Lat (NAD83): 42-02-13.1 N **Long (NAD83):** 088-16-56.3 W **ASR No.:** N/A **Ground Elev:** 223.0

Loc. 8 **Area of Operation**
Operating within a 80.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.77000	FB	1	0	20K0F3E	2.000	2.000	9.0		
1	2	161.61000	FB	1	0	20K0F3E	75.000	200.000	24.0		
3	1	161.61000	FB	1	0	20K0F3E	75.000	140.000	37.0		
4	1	161.61000	FB	1	0	20K0F3E	75.000	140.000	44.0		

4	1	161.61000	FB	1	0	20K0F3E	75.000	140.000	44.0
5	1	161.61000	FB	1	0	20K0F3E	75.000	140.000	46.0
6	1	160.77000	FB	1	0	20K0F3E	40.000	40.000	12.0
7	1	161.61000	FB	1	0	20K0F3E	40.000	75.000	11.0
8	1	161.22000	MO	300	0	20K0F3E	75.000	75.000	
8	1	161.61000	MO	200	0	20K0F3E	5.000	5.000	
8	1	161.61000	MO	200	0	20K0F3E	75.000	75.000	

Control Points **Pt. No.**1

Address: 547 W JACKSON BLVD

City: CHICAGO **County:** **State:** IL **Telephone Number:** (312)322-8263

Associated Call Signs
None

Waivers/Conditions
161.610 GRANDFATHERED

Licensee: Northeast Illinois Regional Commuter Railroad Corporation

FCC Registration Number (FRN):
0002849818

Call Sign: KFW519 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

ATTN Director of Communications
Northeast Illinois Regional Commuter Railroad Corporation
547 W. Jackson Blvd.
CHICAGO, IL 60661-5717

Grant Date	Effective Date	Expiration Date	Print Date
11/18/2003	11/18/2003	02/02/2014	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Area of Operation**
Land Mobile Control Station meeting the 6.1 Meter Rule in the state of IL.

Loc. 2 **Address:** 2801 W GRAND AVE
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-53-34.1 N **Long (NAD83):** 087-41-38.2 W **ASR No.:** **Ground Elev:** 182.0

Loc. 3 **Address:** 147 W 47TH ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-48-30.1 N **Long (NAD83):** 087-40-03.2 W **ASR No.:** **Ground Elev:** 185.0

Loc. 4 **Area of Operation**
Operating within a 80.0 km radius around fixed location 2

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.22000	FX1	1	0	20K0F3E	45.000	45.000			
2	1	160.68000	FB2	1	0	20K0F3E	75.000	216.000	55.0		
3	1	160.68000	FB	1	0	20K0F3E	75.000	200.000	25.0		
4	1	161.22000	MO	75	0	20K0F3E	45.000	45.000			
4	1	161.22000	MO	10	0	20K0F3E	5.000	5.000			

Control Points **Pt. No.**1

Address: 2801 W GRAND AVE

City: CHICAGO **County:** **State:** IL **Telephone Number:** (312)322-2865

Licensee: PENNSYLVANIA LINES LLC

FCC Registration Number (FRN):
0004142501

Call Sign: KGU651 **File Number:**

ATTN J. R. Celio
PENNSYLVANIA LINES LLC
99 Spring Street SW, Box 123
ATLANTA, GA 30303

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
10/03/2001	03/12/2003	11/05/2011	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** CR ROFW MP517.9 361 W 47TH ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-48-32.1 N **Long (NAD83):** 087-38-10.2 W **ASR No.:** N/A **Ground Elev:** 181.0

Loc. 2 **Address:** 5335 S PULASKI RD ROLLING WHEELS M H
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-47-44.1 N **Long (NAD83):** 087-43-23.2 W **ASR No.:** N/A **Ground Elev:** 183.0

Loc. 3 **Address:** CR ROFW MP463.7 NEAR TEAGARDEN ST
City: LA PORTE **County:** LA PORTE **State:** IN
Lat (NAD83): 41-36-36.2 N **Long (NAD83):** 086-43-44.1 W **ASR No.:** N/A **Ground Elev:** 242.0

Loc. 4 **Address:** CR ROFW MP437.4 452 S ARNOLD ST
City: SOUTH BEND **County:** ST. JOSEPH **State:** IN
Lat (NAD83): 41-40-15.2 N **Long (NAD83):** 086-16-02.0 W **ASR No.:** N/A **Ground Elev:** 213.0

Loc. 5 **Area of Operation**
Operating within a 5.0 km radius around fixed location 1

Loc. 6 **Area of Operation**
Operating within a 40.0 km radius around fixed location 3

Loc. 7 **Area of Operation**
Operating within a 40.0 km radius around fixed location 4

Loc. 8 **Address:** Chicago Parks Inn, 17040 South Halsted Street
City: Harvey **County:** COOK **State:** IL
Lat (NAD83): 41-34-52.3 N **Long (NAD83):** 087-38-18.8 W **ASR No.:** **Ground Elev:** 187.0

Loc. 9 **Area of Operation**
Operating within a 10.0 km radius around fixed location 8

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.05500	FB	1	0	20K0F3E	25.000	41.000	12.0	12.0	
2	1	160.80000	FB	1	0	20K0F3E	75.000	135.000	11.0	9.0	

2	1	160.80000	FB	1	0	20K0F3E	75.000	135.000	11.0	9.0	
2	1	161.07000	FB	1	0	20K0F3E	75.000	135.000	11.0	9.0	
3	1	160.54500	FB	1	0	20K0F3E	75.000	144.000	15.0	45.0	
3	2	160.80000	FB	1	0	20K0F3E	75.000	239.000	20.0	50.0	
3	3	161.13000	FBC	1	0	20K0F3E	75.000	135.000	24.0	54.0	
4	1	160.80000	FB	1	0	20K0F3E	75.000	127.000	18.0	-3.0	
4	2	161.13000	FBC	1	0	20K0F3E	75.000	191.000	29.0	8.0	
5	1	161.05500	MO	20	0	20K0F3E	6.000				
6	1	160.71000	MO	5	0	20K0F3E	65.000				
7	1	160.71000	MO	5	0	20K0F3E	65.000				
8	1	160.80000	FB	1	0	20K0F3E	20.000	18.000	3.7	-3.3	03/12/2004
8	1	160.86000	FB	1	0	20K0F3E	20.000	18.000	3.7	-3.3	03/12/2004
8	1	161.07000	FB	1	0	20K0F3E	20.000	18.000	3.7	-3.3	03/12/2004
9	1	160.80000	MO	5	0	20K0F3E	45.000	45.000			03/12/2004
9	1	160.86000	MO	5	0	20K0F3E	45.000	45.000			03/12/2004
9	1	161.07000	MO	5	0	20K0F3E	45.000	45.000			03/12/2004

Control Points **Pt. No.1**

Address: Chicago Parks, 17040 South Halsted Street

City: Harvey **County:** COOK **State:** IL **Telephone Number:** (708)596-1500

Associated Call Signs
WPRJ990

Licensee: ILLINOIS CENTRAL RAILROAD CO

FCC Registration Number (FRN): 0002849362

Call Sign: KIR774 **File Number:**

ATTN COMMUNICATIONS DEPT
ILLINOIS CENTRAL RAILROAD CO
17641 S ASHLAND AVE
HOMEWOOD, IL 60430

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
10/15/1998	10/15/1998	12/07/2003	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** ICRR YARD OFFICE GLEN YARD

City: STICKNEY **County:** COOK **State:** IL

Lat (NAD83): 41-48-18.1 N **Long (NAD83):** 087-46-37.2 W **ASR No.:** N/A **Ground Elev:** 181.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.92000	FB	1	0	20K0F3E	75.000	70.000	9.0		
1	1	161.19000	FB	1	0	20K0F3E	75.000	70.000	9.0		
1	1	161.46000	FB	1	0	20K0F3E	75.000	70.000	9.0		

Control Points **Pt. No.**1

Address: ICRR YARD OFFICE GLEN YARD

City: STICKNEY **County:** **State:** IL **Telephone Number:** (708)206-3500

Licensee: INDIANA HARBOR BELT RAILROAD

FCC Registration Number (FRN):
0002835643

Call Sign: KJW633

File Number:

INDIANA HARBOR BELT RAILROAD
2721 161ST ST
HAMMOND, IN 46323-1099

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
09/01/1999	09/01/1999	10/16/2004	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: FULLERTON AVE 800 E 25TH AVE NORPAUL YARDMASTERS OFC

City: FRANKLIN PARK **County:** COOK **State:** IL

Lat (NAD83): 41-55-23.1 N **Long (NAD83):** 087-51-29.2 W **ASR No.:** **Ground Elev:** 192.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.98000	FB	1	0	16K0F3E	40.000	41.500	10.0		

Control Points Pt. No.1

Address: FULLERTON AVE 800 E 25TH AVE NORPAUL YARDMASTERS OFC

City: FRANKLIN PARK **County:** **State:** IL **Telephone Number:** (219)989-4703

Licensee: Norfolk Southern Railway Company

FCC Registration Number (FRN):
0004228979

Call Sign: KLR331
File Number:

ATTN COMMUNICATIONS AND SIGNAL DEPT
Norfolk Southern Railway Company
99 Spring St., Box 123
Atlanta, GA 30303

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
11/01/1999	03/02/2001	12/08/2004	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** .55 MI W OF INT OF YATES BLVD & 103RD ST

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-42-27.1 N **Long (NAD83):** 087-34-37.2 W **ASR No.:** **Ground Elev:** 178.0

Loc. 2 **Area of Operation**
Operating within a 24.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.48500	FB	1	0	20K0F3E	25.000	31.000	15.0		
2	1	160.48500	MO	16	0	20K0F3E	30.000				

Control Points **Pt. No.**1

Address: YARD MASTER & RIP TRACK 2040 E 106TH ST

City: CHICAGO **County:** **State:** IL **Telephone Number:** (219)493-5369

Licensee: The Burlington Northern and Santa Fe Railway Company

FCC Registration Number (FRN):
0004772877

Call Sign: KNDS965 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

ATTN ROBERT LEEDHAM
The Burlington Northern and Santa Fe Railway Company
4515 KANSAS AVE
KANSAS CITY, KS 66106

Grant Date	Effective Date	Expiration Date	Print Date
06/19/2000	07/24/2001	08/03/2005	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 432 W 14TH ST

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-51-44.1 N **Long (NAD83):** 087-38-20.2 W **ASR No.:** **Ground Elev:** 180.0

Loc. 2 **Area of Operation**
Operating within a 64.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.10000	FB	1	0	20K0F3E	45.000	45.000	15.0		
1	2	160.33500	FB	1	0	20K0F3E	25.000	13.000	16.0		
2	1	160.33500	MO	3	0	20K0F3E	5.000	5.000			
2	1	160.33500	MO	1	0	20K0F3E	30.000	30.000			
2	1	161.10000	MO	50	0	20K0F3E	40.000	40.000			

Control Points **Pt. No.**1

Address: 432 W 14TH ST

City: CHICAGO **County:** **State:** IL **Telephone Number:** (312)294-6521

Licensee: RADICOM INC

FCC Registration Number (FRN):
0002853810

Call Sign: KNEB275
File Number:

RADICOM INC
2604 N CHAPEL HILL RD
MCHENRY, IL 60050

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
11/04/2002	11/04/2002	11/09/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Area of Operation**
Statewide: IL

Loc. 2 **Area of Operation**
Statewide: IL

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	25.00000-50.00000	FB2T	1	0	20K0F3E	200.000				
1	1	150.00000-174.00000	FB2T	1	0	20K0F3E 20K0F2D 20K0F9W	200.000				
1	1	450.00000-470.00000	FX1T	1	0	20K0F3E 20K0F2D 20K0F9W	200.000				
1	1	450.00000-470.00000	FB2T	1	0	20K0F3E 20K0F2D 20K0F9W	200.000				
1	1	470.00000-512.00000	FX1T	1	0	20K0F3E	200.000				
1	1	470.00000-512.00000	FB2T	1	0	20K0F3E	200.000				
1	1	806.00000-821.00000	FX1T	1	0	20K0F3E	100.000				
2	1	25.00000-50.00000	MO	2	0	20K0F3E	200.000				
2	1	150.00000-174.00000	MO	2	0	20K0F3E 20K0F2D 20K0F9W	200.000				
2	1	450.00000-470.00000	MO	2	0	20K0F3E 20K0F2D 20K0F9W	200.000				
2	1	470.00000-512.00000	MO	2	0	20K0F3E	200.000				
2	1	806.00000-821.00000	MO	2	0	20K0F3E	100.000				

Control Points Pt. No.1

Address:

City: **County:** **State:** **Telephone Number:** (815)385-4224

Licensee: CSX TRANSPORTATION INC

FCC Registration Number (FRN): 0002036325

Call Sign: KNJM324 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

ATTN T C MILLER COMM DEPT J 958
CSX TRANSPORTATION INC
5220 BELFORT RD STE 300
JACKSONVILLE, FL 32256

Grant Date	Effective Date	Expiration Date	Print Date
05/01/2004	05/01/2004	07/03/2014	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: .5 MI S OF 71 SR CROSSING GRAND TRUNK RR

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-45-27.1 N **Long (NAD83):** 087-42-44.2 W **ASR No.:** **Ground Elev:** 187.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.37000	FB	1	0	20K0F3E	5.000	5.000	5.0		

Control Points Pt. No.1

Address: HAYFORD INTERLOCKING PLANT .5 MI S OF 71ST ST RD CROSSING GRAND TRUCK RR

City: CHICAGO **County:** **State:** IL **Telephone Number:** (904)359-1329

Licensee: ISG SOUTH CHICAGO & INDIANA HARBOR RAILWAY COMPANY

ATTN BRAD BOSQUET
ISG SOUTH CHICAGO & INDIANA HARBOR RAILWAY COMPANY
C/O INT L STEEL GROUP INC MANHATTAN TOWER 19TH FLOOR
101 E
NEW YORK, NY 10022

FCC Registration Number (FRN):
0006848741

Call Sign: KNEP439 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
10/06/1999	05/22/2002	12/04/2004	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 9746 S AVENUE N

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-39-50.1 N **Long (NAD83):** 087-31-25.2 W **ASR No.:** **Ground Elev:** 186.0

Loc. 2 **Area of Operation**
Operating within a 32.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.33500	FB	1	0	20K0F3E	60.000	60.000	10.0		
2	1	160.33500	MO	20	0	16K0F3E	5.000	5.000			
2	1	160.33500	MO	10	0	20K0F3E	45.000	45.000			
2	1	160.80000	MO	10	0	20K0F3E	45.000	45.000			

Control Points **Pt. No.**1

Address: 9746 SOUTH AVE

City: NORTH CHICAGO **County:** **State:** IL **Telephone Number:** (312)768-6405

Licensee: GRAND TRUNK WESTERN RAILROAD

FCC Registration Number (FRN):
0003688876

ATTN COMMUNICATIONS- Terry Woolston
GRAND TRUNK WESTERN RAILROAD
700 PERSHING Ave
PONTIAC, MI 48340-2365

Call Sign: KNHJ864 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
01/20/2004	01/20/2004	10/06/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: HAYFORD TOWER AT INT BRC AND GTWRR

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-45-27.1 N **Long (NAD83):** 087-42-45.2 W **ASR No.:** **Ground Elev:** 189.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.59000	FB	1	0	20K0F3E	75.000	150.000	11.0		
1	1	160.84500	FB	1	0	20K0F3E	75.000	150.000	11.0		

Control Points Pt. No.1

Address: HAYFORD TOWER AT INT BRC AND GTWRR

City: CHICAGO **County:** **State:** IL **Telephone Number:** (248)452-4750

Federal Communications Commission
Wireless Telecommunications Bureau

Radio Station Authorization (Reference Copy)

This is not an official FCC license. It is a record of public information contained in the FCC's licensing database on the date that this reference copy was generated. In cases where FCC rules require the presentation, posting, or display of an FCC license, this document may not be used in place of an official FCC license.

Licensee: CSX TRANSPORTATION INC

FCC Registration Number (FRN):
0002036325

ATTN T C MILLER
CSX TRANSPORTATION INC
5220 BELFORT RD STE 300
JACKSONVILLE, FL 32256

Call Sign: KNIC661
File Number:

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
05/14/2003	05/14/2003	07/29/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** VIC OF 71ST ST & SAYER AVE
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-45-54.1 N **Long (NAD83):** 087-47-39.2 W **ASR No.:** N/A **Ground Elev:** 188.0

Loc. 2 **Address:** CHICAGO TERM BARR YD AT HALSTEAD ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-38-57.1 N **Long (NAD83):** 087-38-29.2 W **ASR No.:** N/A **Ground Elev:** 38.0

Loc. 3 **Address:** HALSTEAD ST TWR BARR YD
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-38-55.1 N **Long (NAD83):** 087-38-44.2 W **ASR No.:** N/A **Ground Elev:** 183.0

Loc. 4 **Address:** ASHLAND AVE TWR BARR YD
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-38-59.1 N **Long (NAD83):** 087-39-36.2 W **ASR No.:** N/A **Ground Elev:** 183.0

Loc. 5 **Address:** 1700 W 167TH ST
City: CALUMET CITY **County:** COOK **State:** IL
Lat (NAD83): 41-35-16.1 N **Long (NAD83):** 087-33-39.2 W **ASR No.:** N/A **Ground Elev:** 183.0

Loc. 6 **Area of Operation**
Operating within a 40.0 km radius around fixed location 2

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.37000	FB	1	0	20K0F3E	75.000	100.000	17.0	12.0	
2	1	160.36500	FB	1	0	20K0F3E	75.000	210.000	38.0	31.0	
3	1	160.23000	FB	1	0	20K0F3E	40.000	40.000	12.0	5.0	
3	1	160.27500	FB	1	0	20K0F3E	40.000	40.000	12.0	5.0	
3	1	160.29000	FB	1	0	20K0F3E	40.000	40.000	12.0	5.0	
4	1	160.23000	FB	1	0	20K0F3E	40.000	40.000	12.0	3.0	
4	1	160.27500	FB	1	0	20K0F3E	40.000	40.000	12.0	3.0	
4	1	160.74000	FB	1	0	20K0F3E	40.000	40.000	12.0	3.0	
4	1	160.78500	FB	1	0	20K0F3E	40.000	40.000	12.0	3.0	
5	1	160.23000	FB	1	0	20K0F3E	50.000	50.000	15.0	11.0	
5	1	160.29000	FB	1	0	20K0F3E	50.000	50.000	15.0	11.0	
5	1	160.32000	FB	1	0	20K0F3E	50.000	50.000	15.0	11.0	
5	1	160.78500	FB	1	0	20K0F3E	50.000	50.000	15.0	11.0	
5	1	160.87500	FB	1	0	20K0F3E	50.000	50.000	15.0	11.0	
5	1	160.98000	FB	1	0	20K0F3E	50.000	50.000	15.0	11.0	
5	1	161.37000	FB	1	0	20K0F3E	50.000	50.000	15.0	11.0	
5	1	161.41500	FB	1	0	20K0F3E	50.000	50.000	15.0	11.0	
5	1	161.52000	FB	1	0	20K0F3E	50.000	50.000	15.0	11.0	
6	1	160.36500	MO	15	0	20K0F3E	45.000				

Control Points Pt. No.1

Address: VIC OF 71ST ST & SAYER AVE BEDFORD PK

City: CHICAGO **County:** **State:** IL **Telephone Number:** (904)388-2180

Associated Call Signs
None

Waivers/Conditions
None

Conditions
Pursuant to Section 309(h) of the Communications Act of 1934, as amended, 47 U.S.C. Section 309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. Section 310(d). This license is subject in terms to the right of use or control conferred by Section 706 of the Communications Act of 1934, as amended. See 47 U.S.C. Section 706.

FCC 601 - LM
July 2002

Licensee: INDIANA HARBOR BELT RAILROAD

FCC Registration Number (FRN): 0002835643

Call Sign: KQR394 **File Number:**

INDIANA HARBOR BELT RAILROAD
2721 161ST ST
HAMMOND, IN 46323-1099

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
09/01/1999	09/01/1999	10/16/2004	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** ARGO TOWER 600 NW ARCHER AVE & 63RD ST

City: SUMMIT **County:** COOK **State:** IL

Lat (NAD83): 41-46-40.1 N **Long (NAD83):** 087-48-56.2 W **ASR No.:** **Ground Elev:** 184.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.98000	FB	1	0	16K0F3E	40.000	41.500	15.0		

Control Points **Pt. No.**1

Address: ARGO TOWER 600 NW ARCHER AVE & 63RD ST

City: SUMMIT **County:** **State:** IL **Telephone Number:** (219)989-4703

Licensee: ILLINOIS CENTRAL GULF RAILROAD CO

FCC Registration Number (FRN):
0002849362

Call Sign: KRR918 **File Number:**

ATTN COMM DEPT HOMEWOOD ADMIN BLDG
ILLINOIS CENTRAL GULF RAILROAD CO
17641 S ASHLAND AVE
HOMEWOOD, IL 60430

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
05/04/2002	05/04/2002	04/10/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: ASH ST INTERLOCKER TOWER AT CROSSING OF B & O CT RR & ICG RR

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-50-08.1 N **Long (NAD83):** 087-41-11.2 W **ASR No.:** **Ground Elev:** 184.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.92000	FB	1	0	16K0F3E	10.000	10.000	11.0		
1	1	161.19000	FB	1	0	16K0F3E	10.000	10.000	11.0		
1	1	161.28000	FB	1	0	16K0F3E	10.000	10.000	11.0		
1	1	161.29500	FB	1	0	16K0F3E	10.000	10.000	11.0		
1	1	161.46000	FB	1	0	16K0F3E	10.000	10.000	11.0		

Control Points Pt. No.1

Address: ASH ST INTERLOCKER TOWER AT CROSSING OF B & O CT RR & ICG RR

City: CHICAGO **County:** **State:** IL **Telephone Number:** (708)206-3500

Licensee: The Burlington Northern and Santa Fe Railway Company

FCC Registration Number (FRN):
0004772877

Call Sign: KSA569 **File Number:**

ATTN ROBERT LEEDHAM
The Burlington Northern and Santa Fe Railway Company
4515 KANSAS AVE
KANSAS CITY, KS 66106

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
12/06/2000	07/24/2001	01/03/2011	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 38TH & CENTRAL PARK AVE

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-49-26.1 N **Long (NAD83):** 087-42-51.2 W **ASR No.:** **Ground Elev:** 182.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.65000	FB	1	0	20K0F3E	65.000	206.000	19.0		
1	1	160.99500	FB	1	0	20K0F3E	65.000	206.000	19.0		

Control Points **Pt. No.**1

Address: SANTA FE YD OFC 38TH & CENTRAL PARK AVE

City: CHICAGO **County:** **State:** IL **Telephone Number:**

Licensee: Northeast Illinois Regional Commuter Railroad Corporation

FCC Registration Number (FRN):
0002849818

Call Sign: KSA950 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

ATTN Director of Communications
Northeast Illinois Regional Commuter Railroad Corporation
547 W. Jackson Blvd.
CHICAGO, IL 60661-5717

Grant Date	Effective Date	Expiration Date	Print Date
07/10/2003	07/10/2003	10/05/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 123RD AND VINCENNCES
City: BLUE ISLAND **County:** COOK **State:** IL
Lat (NAD83): 41-40-09.1 N **Long (NAD83):** 087-40-24.2 W **ASR No.:** N/A **Ground Elev:** 187.0

Loc. 3 **Address:** 149 W 47TH ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-48-10.1 N **Long (NAD83):** 087-37-49.2 W **ASR No.:** N/A **Ground Elev:** 184.0

Loc. 4 **Address:** 16TH ST AND CLARK ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-52-38.1 N **Long (NAD83):** 087-37-52.2 W **ASR No.:** N/A **Ground Elev:** 183.0

Loc. 5 **Address:** 89TH ST AND VINCENNCES
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-43-59.1 N **Long (NAD83):** 087-41-09.2 W **ASR No.:** N/A **Ground Elev:** 187.0

Loc. 6 **Address:** 135 W 63RD ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-46-46.1 N **Long (NAD83):** 087-37-41.2 W **ASR No.:** N/A **Ground Elev:** 185.0

Loc. 7 **Area of Operation**
Operating within a 80.0 km radius around fixed location 5

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.34000	FB	1	0	20K0F3E	75.000	216.000	35.0		
1	2	160.60500	FB	1	0	20K0F3E	75.000	216.000	50.0		
3	1	161.34000	FB	1	0	20K0F3E	75.000	216.000	24.0		
4	1	161.34000	FB	1	0	20K0F3E	45.000	80.000	18.0		
5	1	161.34000	FB	1	0	20K0F3E	45.000	80.000	16.0		
6	1	161.34000	FB	1	0	20K0F3E	75.000	150.000	7.0		
7	1	161.34000	MO	100	0	20K0F3E	45.000	45.000			

7	1	161.34000	MO	100	0	20K0F3E	[illegible]	[illegible]
7	1	161.34000	MO	50	0	20K0F3E	5.000	5.000
7	1	161.34000	MO	100	0	20K0F3E	75.000	75.000

Control Points **Pt. No.1**

Address: 547 W JACKSON BLVD

City: CHICAGO **County:** **State:** IL **Telephone Number:** (312)322-8263

Licensee: BELT RADIO COMMUNICATIONS INC

FCC Registration Number (FRN):
0003932977

Call Sign: KSE225 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

ATTN TIMOTHY E COFFEY
BELT RADIO COMMUNICATIONS INC
6900 S CENTRAL AVE
BEDFORD PARK, IL 60638-6312

Grant Date	Effective Date	Expiration Date	Print Date
03/19/2002	03/19/2002	02/18/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 6900 S CENTRAL AVE

City: BEDFORD PARK **County:** COOK **State:** IL

Lat (NAD83): 41-46-09.1 N **Long (NAD83):** 087-45-40.2 W **ASR No.:** **Ground Elev:** 188.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.96500	FB	1	0	16K0F3E	40.000	10.000	18.0		

Control Points **Pt. No.**1

Address: HUMPMASTERS OFFICE 6900 S CENTRAL AVE

City: CHICAGO **County:** **State:** IL **Telephone Number:** (708)496-4048

Licensee: Soo Systems Radio Communications Corporation

FCC Registration Number (FRN):
0002606689

Call Sign: KSE702 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

ATTN James C Thomas
Soo Systems Radio Communications Corporation
PO Box 530
501 Marquette Ave
MINNEAPOLIS, MN 55402

Grant Date	Effective Date	Expiration Date	Print Date
05/18/2004	05/18/2004	07/15/2014	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Area of Operation**
Statewide: ND

Loc. 2 **Area of Operation**
Statewide: MN

Loc. 3 **Area of Operation**
Statewide: IA

Loc. 4 **Area of Operation**
Statewide: WI

Loc. 5 **Area of Operation**
Statewide: IL

Loc. 6 **Area of Operation**
Statewide: IN

Loc. 7 **Area of Operation**
Statewide: MO

Loc. 8 **Area of Operation**
Statewide: KY

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.77000	FBT	10	0	20K0F3E	45.000	104.000			
1	1	161.08500	FBT	10	0	20K0F3E	45.000	104.000			
1	1	161.37000	FBT	10	0	20K0F3E	45.000	104.000			
1	1	161.52000	FBT	10	0	20K0F3E	45.000	104.000			
2	1	160.77000	FBT	10	0	20K0F3E	45.000	104.000			
2	1	161.08500	FBT	10	0	20K0F3E	45.000	104.000			
2	1	161.37000	FBT	10	0	20K0F3E	45.000	104.000			
2	1	161.52000	FBT	10	0	20K0F3E	45.000	104.000			
3	1	160.77000	FBT	10	0	20K0F3E	45.000	104.000			
3	1	161.08500	FBT	10	0	20K0F3E	45.000	104.000			
3	1	161.37000	FBT	10	0	20K0F3E	45.000	104.000			

3	1	161.37000	FBT	10	0	20K0F3E	45.000	104.000
3	1	161.52000	FBT	10	0	20K0F3E	45.000	104.000
4	1	160.77000	FBT	10	0	20K0F3E	45.000	104.000
4	1	161.08500	FBT	10	0	20K0F3E	45.000	104.000
4	1	161.37000	FBT	10	0	20K0F3E	45.000	104.000
4	1	161.52000	FBT	10	0	20K0F3E	45.000	104.000
5	1	160.77000	FBT	10	0	20K0F3E	45.000	104.000
5	1	161.08500	FBT	10	0	20K0F3E	45.000	104.000
5	1	161.37000	FBT	10	0	20K0F3E	45.000	104.000
5	1	161.52000	FBT	10	0	20K0F3E	45.000	104.000
6	1	160.77000	FBT	10	0	20K0F3E	45.000	104.000
6	1	161.08500	FBT	10	0	20K0F3E	45.000	104.000
6	1	161.37000	FBT	10	0	20K0F3E	45.000	104.000
6	1	161.52000	FBT	10	0	20K0F3E	45.000	104.000

Licensee: CSX TRANSPORTATION INC

FCC Registration Number (FRN): 0002036325

Call Sign: KUS514 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

ATTN T C MILLER COMM DEPT J 958
CSX TRANSPORTATION INC
5220 BELFORT RD STE 300
JACKSONVILLE, FL 32256

Grant Date	Effective Date	Expiration Date	Print Date
01/04/2003	01/04/2003	02/17/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: CSX & CT RR 48TH AVE YD 1111 S CICERO AVE
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-52-04.1 N **Long (NAD83):** 087-44-40.2 W **ASR No.:** **Ground Elev:** 185.0

Loc. 2 Address: CSX & CT RR LIGHT TOWER HALSTEAD ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-38-58.1 N **Long (NAD83):** 087-38-29.2 W **ASR No.:** **Ground Elev:** 183.0

Loc. 3 Address: RR MILEPOST 215.9
City: CLAREMONT **County:** RICHLAND **State:** IL
Lat (NAD83): 38-43-13.2 N **Long (NAD83):** 088-00-22.1 W **ASR No.:** **Ground Elev:** 158.0

Loc. 4 Address: RR YD OFC JASPER & E CERRO GORDO ST
City: DECATUR **County:** MACON **State:** IL
Lat (NAD83): 39-50-51.1 N **Long (NAD83):** 088-56-24.3 W **ASR No.:** **Ground Elev:** 204.0

Loc. 5 Address: RR STA 225 RAILROAD ST
City: FLORA **County:** CLAY **State:** IL
Lat (NAD83): 38-39-55.2 N **Long (NAD83):** 088-29-19.2 W **ASR No.:** **Ground Elev:** 149.0

Loc. 6 Address: RR MILEPOST 239.1
City: FLORA **County:** CLAY **State:** IL
Lat (NAD83): 38-40-58.2 N **Long (NAD83):** 088-25-42.2 W **ASR No.:** **Ground Elev:** 141.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.78500	FB	1	0	20K0F3E	35.000	66.000	25.0	0.0	
1	1	160.87500	FB	1	0	20K0F3E	35.000	66.000	25.0	0.0	
2	1	160.78500	FB	1	0	20K0F3E	35.000	63.000	38.0	0.0	
2	1	160.87500	FB	1	0	20K0F3E	35.000	63.000	38.0	0.0	
3	1	160.23000	FB	1	0	20K0F2D 20K0F3E	5.000	4.600	5.0	0.0	

						20K0F3E				
4	1	160.23000	FB	1	0	20K0F3E	45.000	111.000	29.0	0.0
4	1	160.32000	FB	1	0	20K0F3E	45.000	111.000	29.0	0.0
4	1	160.78500	FB	1	0	20K0F3E	45.000	111.000	29.0	0.0
4	1	161.16000	FB	1	0	20K0F3E	45.000	111.000	29.0	0.0
5	1	160.23000	FB	1	0	20K0F3E	75.000	75.000	15.0	0.0
5	1	160.32000	FB	1	0	20K0F3E	75.000	75.000	15.0	0.0
5	1	160.53000	FB	1	0	20K0F3E	75.000	75.000	15.0	0.0
5	1	161.16000	FB	1	0	20K0F3E	75.000	75.000	15.0	0.0
6	1	160.23000	FB	1	0	20K0F2D 20K0F3E	5.000	4.600	5.0	0.0

Control Points **Pt. No.**1

Address: 733 W 135TH ST

City: RIVERDALE **County:** **State:** IL **Telephone Number:** (312)471-7153

Associated Call Signs
KA2192, KA4101

Licensee: The Burlington Northern and Santa Fe Railway Company

FCC Registration Number (FRN): 0004772877

Call Sign: KSA993 **File Number:**

ATTN Robert Leedham
The Burlington Northern and Santa Fe Railway Company
4515 KANSAS AVE
KANSAS CITY, KS 66106

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
09/17/2002	09/17/2002	11/19/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 547 WEST JACKSON BLVD

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-52-40.1 N **Long (NAD83):** 087-38-30.2 W **ASR No.:** **Ground Elev:** 181.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.10000	FB	1	0	20K0F3E	75.000		76.0		
1	1	161.16000	FB	1	0	20K0F3E	75.000		76.0		

Control Points Pt. No.1

Address: 547 WEST JACKSON BLVD

City: CHICAGO **County:** **State:** IL **Telephone Number:** (612)298-2555

Licensee: Northeast Illinois Regional Commuter Railroad Corporation

FCC Registration Number (FRN): 0002849818

Call Sign: KSB864

File Number:

ATTN Director of Communications
Northeast Illinois Regional Commuter Railroad Corporation
547 W. Jackson Blvd.
CHICAGO, IL 60661-5717

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
06/17/2003	03/19/2004	09/08/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 2 Address: 191 ST & ROCK ISLAND CROSSING
City: MOKENA **County:** WILL **State:** IL
Lat (NAD83): 41-32-33.1 N **Long (NAD83):** 087-51-37.2 W **ASR No.:** N/A **Ground Elev:** 214.0

Loc. 4 Address: JOLIET COACH YARD
City: JOLIET **County:** WILL **State:** IL
Lat (NAD83): 41-31-28.1 N **Long (NAD83):** 088-04-21.2 W **ASR No.:** N/A **Ground Elev:** 166.0

Loc. 5 Area of Operation
Operating within a 40.0 km radius around fixed location 2

Loc. 6 Area of Operation
Operating within a 40.0 km radius around fixed location 2

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
2	1	161.34000	FB	1	0	16K0F3E	40.000	146.000	18.0		
2	2	161.61000	FB	1	0	16K0F3E	69.000	200.000	35.0		
2	3	160.44000	FB	1	0	16K0F3E	40.000	105.000	61.0		
4	1	161.34000	FB	1	0	16K0F3E	40.000	146.000	18.0		
4	2	161.61000	FB	1	0	16K0F3E	69.000	200.000	35.0		
4	3	160.68000	FB	1	0	16K0F3E	63.000	200.000	61.0		
5	1	160.44000	MO	150	0	16K0F3E	40.000	40.000			02/04/2004
5	1	160.44000	MO	25	0	16K0F3E	75.000	75.000			02/04/2004
6	1	160.44000	MO	100	0	16K0F3E	5.000	5.000			02/04/2004

Control Points Pt. No.1

Address: COMMUNICATIONS ENGINEER 547 W JACKSON BLVD 4TH FLR ENGINEERING
City: CHICAGO **County:** COOK **State:** IL **Telephone Number:** (312)322-8263

Licensee: CHICAGO SOUTHSHORE & SOUTH BEND RAILROAD

FCC Registration Number (FRN): 0002842672

Call Sign: KSD525 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

ATTN TERRY HEARST
CHICAGO SOUTHSHORE & SOUTH BEND RAILROAD
505 N CARROLL AVE
MICHIGAN CITY, IN 46360

Grant Date	Effective Date	Expiration Date	Print Date
02/19/2003	02/19/2003	04/27/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 5710 CLINE AVE
City: HAMMOND **County:** LAKE **State:** IN
Lat (NAD83): 41-36-32.1 N **Long (NAD83):** 087-28-58.1 W **ASR No.:** **Ground Elev:** 186.0

Loc. 2 **Address:** 505 N CARROLL AVE RR SHOPS & YARD
City: MICHIGAN CITY **County:** LA PORTE **State:** IN
Lat (NAD83): 41-42-25.1 N **Long (NAD83):** 086-51-35.1 W **ASR No.:** **Ground Elev:** 183.0

Loc. 3 **Address:** SMILAX RD AT TRACKS
City: NEW CARLISLE **County:** LA PORTE **State:** IN
Lat (NAD83): 41-42-15.2 N **Long (NAD83):** 086-27-00.1 W **ASR No.:** **Ground Elev:** 226.0

Loc. 4 **Area of Operation**
Operating within a 80.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.35500	FB2	1	0	16K0F3E	70.000	160.000	15.0	0.0	
2	1	161.01000	FX1	1	0	16K0F3E	60.000	202.000	44.0	0.0	
2	1	161.35500	FB2	1	0	16K0F3E	60.000	202.000	44.0	0.0	
3	1	161.35500	FB2	1	0	16K0F3E	70.000	232.000	24.0	0.0	
4	1	161.01000	MO	65	0	16K0F3E	45.000				
4	1	161.02500	MO	30	0	16K0F3E	45.000				
4	1	161.10000	MO	10	0	16K0F3E	45.000				
4	1	161.35500	MO	65	0	16K0F3E	45.000				

Control Points **Pt. No.**1

Address: 5710 CLINE AVE

City: HAMMOND **County:** **State:** IN **Telephone Number:** (219)874-9000

Licensee: The Burlington Northern and Santa Fe Railway Company

FCC Registration Number (FRN): 0004772877

Call Sign: KSE996 **File Number:**

ATTN ROBERT LEEDHAM
The Burlington Northern and Santa Fe Railway Company
4515 KANSAS AVE
KANSAS CITY, KS 66106

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
05/09/2000	07/24/2001	06/25/2005	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** SANTA FE YD OFC

City: HODGKINS **County:** COOK **State:** IL

Lat (NAD83): 41-45-02.1 N **Long (NAD83):** 087-52-02.2 W **ASR No.:** **Ground Elev:** 184.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.65000	FB	1	0	16K0F3E	45.000		15.0		

Control Points **Pt. No.**1

Address: SANTA FE YD OFC

City: HODGKINS **County:** **State:** IL **Telephone Number:**

Licensee: The Burlington Northern and Santa Fe Railway Company

FCC Registration Number (FRN):
0004772877

Call Sign: KSF754 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

ATTN ROBERT LEEDHAM
The Burlington Northern and Santa Fe Railway Company
4515 KANSAS AVE
KANSAS CITY, KS 66106

Grant Date	Effective Date	Expiration Date	Print Date
04/17/2000	07/24/2001	05/31/2005	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: CORWITH YD 4525 S LAWNDALE AVE

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-48-35.1 N **Long (NAD83):** 087-42-55.2 W **ASR No.:** **Ground Elev:** 182.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.65000	FB	1	0	16K0F3E	30.000		18.0		
1	1	160.78500	FB	1	0	16K0F3E	30.000		18.0		

Control Points Pt. No.1

Address: CORWITH YD 4525 S LAWNDALE AVE

City: CHICAGO **County:** **State:** IL **Telephone Number:**

Licensee: INDIANA HARBOR BELT RAILROAD

FCC Registration Number (FRN):
0002835643

Call Sign: KTI613 **File Number:**

INDIANA HARBOR BELT RAILROAD
PO Box 389
HAMMOND, IN 46325

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
10/30/2001	10/30/2001	10/30/2011	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: NORPAUL YARD OFFICE S OF FULLERTON AVE & E OF 25TH ST

City: FRANKLIN PARK **County:** COOK **State:** IL

Lat (NAD83): 41-55-23.1 N **Long (NAD83):** 087-51-29.2 W **ASR No.:** **Ground Elev:** 192.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.07000	FB	1	0	16K0F3E	35.500	35.500	8.0		

Control Points Pt. No.1

Address:

City: **County:** **State:** **Telephone Number:** (219)989-4703

Licensee: Norfolk Southern Railway Company

FCC Registration Number (FRN): 0004228979

Call Sign: KVK389

File Number:

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

ATTN COMMUNICATIONS AND SIGNAL DEPT
Norfolk Southern Railway Company
99 Spring St., Box 123
Atlanta, GA 30303

Grant Date	Effective Date	Expiration Date	Print Date
05/22/2003	05/22/2003	08/08/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 2543 W COLUMBUS

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-45-19.1 N **Long (NAD83):** 087-41-26.2 W **ASR No.:** **Ground Elev:** 186.0

Loc. 2 Area of Operation
Operating within a 24.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.41500	FB	1	0	16K0F3E	30.000	30.000	9.0		
2	1	161.41500	MO	20	0	16K0F3E	30.000				

Control Points Pt. No.1

Address: CARMAN SHACK 2548 W COLUMBUS AVE

City: CHICAGO **County:** **State:** IL **Telephone Number:** (312)933-8004

Licensee: Norfolk Southern Railway Company

FCC Registration Number (FRN):
0004228979

Call Sign: KVK390 **File Number:**

ATTN COMMUNICATIONS AND SIGNAL DEPT
Norfolk Southern Railway Company
99 Spring St., Box 123
Atlanta, GA 30303

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
06/04/2002	06/04/2002	07/02/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 2543 W COLUMBUS AVE
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-45-24.1 N **Long (NAD83):** 087-41-10.2 W **ASR No.:** **Ground Elev:** 187.0

Loc. 2 **Address:** 2700 W 79TH ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-45-09.1 N **Long (NAD83):** 087-41-30.2 W **ASR No.:** **Ground Elev:** 187.0

Loc. 3 **Area of Operation**
Operating within a 8.0 km radius around fixed location 1

Loc. 4 **Area of Operation**
Operating within a 8.0 km radius around fixed location 2

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.51500	FB	1	0	20K0F3E	10.000	16.000	12.0	0.0	
2	1	160.51500	FB	1	0	20K0F3E	8.000	6.000	6.0	0.0	
3	1	160.51500	MO	20	0	20K0F3E	5.000				
4	1	160.51500	MO	20	0	20K0F3E	5.000				

Control Points **Pt. No.**1
Address: INTERMODAL OFFICE LANDERS YARD
City: CHICAGO **County:** **State:** IL **Telephone Number:** (800)448-4385

Licensee: NATIONAL RAILROAD PASSENGER CORP AMTRAK

FCC Registration Number (FRN): 0002159770

Call Sign: KVU343 **File Number:**

ATTN RADIO COMMUNICATIONS ENGINEERING
NATIONAL RAILROAD PASSENGER CORP AMTRAK
30TH ST STATION BOX 41
PHILADELPHIA, PA 19104

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
06/28/2001	06/28/2001	07/09/2011	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: AMTRAK COMMISSARY 1500 S LUMBER ST

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-51-42.1 N **Long (NAD83):** 087-38-07.2 W **ASR No.:** **Ground Elev:** 180.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.30500	FB	1	0	16K0F3E	10.000		14.0		

Control Points **Pt. No.**1

Address: 1500 S LUMBER ST

City: CHICAGO **County:** **State:** IL **Telephone Number:** (215)349-1986

Licensee: The Burlington Northern and Santa Fe Railway Company

ATTN Robert Leedham
The Burlington Northern and Santa Fe Railway Company
4515 KANSAS AVE
KANSAS CITY, KS 66106

FCC Registration Number (FRN): 0004772877

Call Sign: KWS432

File Number:

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
02/05/2002	02/05/2002	03/10/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: BN HUMP TOWER 5400 W OGDEN AVE

City: CICERO **County:** COOK **State:** IL

Lat (NAD83): 41-50-27.1 N **Long (NAD83):** 087-45-29.2 W **ASR No.:** **Ground Elev:** 189.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.60500	FB	1	0	16K0F3E	35.000		9.0		
1	1	160.80000	FB	1	0	16K0F3E	35.000		9.0		

Control Points Pt. No.1

Address: BN HUMP TOWER 5400 W OGDEN AVE

City: CICERO **County:** **State:** IL **Telephone Number:**

Licensee: INDIANA HARBOR BELT RAILROAD

FCC Registration Number (FRN):
0002835643

Call Sign: KYN285 **File Number:**

INDIANA HARBOR BELT RAILROAD
2721 161ST ST
HAMMOND, IN 46323-1099

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
03/01/2001	03/01/2001	02/04/2011	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 600 E RIDGELAND AVE 200 N 103RD ST

City: CHICAGO RIDGE **County:** COOK **State:** IL

Lat (NAD83): 41-42-20.1 N **Long (NAD83):** 087-46-39.2 W **ASR No.:** **Ground Elev:** 180.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.44000	FB	1	0	16K0F3E	35.000	41.500	19.0		
1	1	160.77000	FB	1	0	16K0F3E	35.000	41.500	19.0		
1	1	160.98000	FB	1	0	16K0F3E	35.000	41.500	19.0		
1	1	161.07000	FB	1	0	16K0F3E	35.000	41.500	19.0		

Control Points Pt. No.1

Address: 600 E RIDGELAND AVE 200 N 103RD ST

City: CHICAGO RIDGE **County:** **State:** IL **Telephone Number:** (219)989-4705

Federal Communications Commission
Wireless Telecommunications Bureau

Radio Station Authorization (Reference Copy)

This is not an official FCC license. It is a record of public information contained in the FCC's licensing database on the date that this reference copy was generated. In cases where FCC rules require the presentation, posting, or display of an FCC license, this document may not be used in place of an official FCC license.

Licensee: PENNSYLVANIA LINES LLC

FCC Registration Number (FRN):
0004142501

Call Sign: WNIA323 **File Number:**

ATTN J R CELIO
PENNSYLVANIA LINES LLC
99 SPRING ST SW BOX 123
ATLANTA, GA 30303

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
06/10/2003	06/23/2004	08/24/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 506 W 51ST ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-48-07.1 N **Long (NAD83):** 087-38-12.2 W **ASR No.:** **Ground Elev:** 180.0

Loc. 3 **Address:** PARK MANOR YD OFC, 169 E 69TH ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-46-28.1 N **Long (NAD83):** 087-37-01.2 W **ASR No.:** **Ground Elev:** 178.0

Loc. 4 **Area of Operation**
Operating within a 40.0 km radius around fixed location 3

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.80000	FB	1	0	20K0F3E	60.000	68.000	12.0	11.7	
1	1	160.86000	FB	1	0	20K0F3E	60.000	68.000	12.0	11.7	
1	1	161.07000	FB	1	0	20K0F3E	60.000	68.000	12.0	11.7	
1	2	160.54500	FB	1	0	20K0F3E	60.000	105.000	20.0	19.7	
3	1	151.83500	FB	1	0	20K0F3E	60.000	68.000	15.0	13.2	06/23/2005
3	1	160.80000	FB	1	0	20K0F3E	60.000	68.000	15.0	13.2	

3	1	160.86000	FB	1	0	20K0F3E	60.000	68.000	15.0	13.2	
3	1	161.07000	FB	1	0	20K0F3E	60.000	68.000	15.0	13.2	
3	2	160.56000	FB	1	0	20K0F3E	20.000	20.000	15.0	13.2	06/23/2005
4	1	151.83500	MO	10	0	20K0F3E	25.000	25.000			06/23/2005

Control Points **Pt. No.1**

Address: PARK MANOR YD OFC, 169 E 63RD ST

City: CHICAGO **County:** COOK **State:** IL **Telephone Number:** (773)538-9367

Associated Call Signs
WPRJ990

Waivers/Conditions
None

Conditions
Pursuant to Section 309(h) of the Communications Act of 1934, as amended, 47 U.S.C. Section 309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. Section 310(d). This license is subject in terms to the right of use or control conferred by Section 706 of the Communications Act of 1934, as amended. See 47 U.S.C. Section 706.

FCC 601 - LM
July 2002

CLOSE WINDOW

Licensee: The Burlington Northern and Santa Fe Railway Company

FCC Registration Number (FRN):
0004772877

Call Sign: WNAE990 **File Number:**

ATTN ROBERT LEEDHAM
The Burlington Northern and Santa Fe Railway Company
4515 KANSAS AVE
KANSAS CITY, KS 66106

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
08/31/2000	07/24/2001	11/07/2005	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: OAKWOOD & EAST WARREN ST

City: DOWNERS GROVE **County:** DU PAGE **State:** IL

Lat (NAD83): 41-47-45.1 N **Long (NAD83):** 088-01-06.2 W **ASR No.:** **Ground Elev:** 216.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.10000	FB	1	0	20K0F3E	75.000		37.0	0.0	
1	1	161.16000	FB	1	0	20K0F3E	75.000		37.0	0.0	

Control Points Pt. No.1

Address: BN DISPATCHERS OFC 5405 W 26TH

City: CICERO **County:** **State:** IL **Telephone Number:** (612)298-2555

Licensee: Northeast Illinois Regional Commuter Railroad Corporation

ATTN Director of Communications
Northeast Illinois Regional Commuter Railroad Corporation
547 W JACKSON BLVD
CHICAGO, IL 60661-5717

FCC Registration Number (FRN):
0002849818

Call Sign: WNBG753
File Number:

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
11/18/2003	11/18/2003	02/02/2014	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 547 W JACKSON
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-52-39.1 N **Long (NAD83):** 087-38-30.2 W **ASR No.:** **Ground Elev:** 181.0

Loc. 2 **Address:** 2801 W GRAND AVE
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-53-34.1 N **Long (NAD83):** 087-41-38.2 W **ASR No.:** **Ground Elev:** 182.0

Loc. 3 **Area of Operation**
Operating within a 80.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.60500	FB	1	0	20K0F3E	75.000	200.000	67.0		
2	1	160.60500	FB	1	0	20K0F3E	75.000	216.000	40.0		
3	1	160.60500	MO	40	0	20K0F3E	5.000	5.000			
3	1	160.60500	MO	30	0	20K0F3E	75.000	75.000			
3	1	161.20500	MO	12	0	20K0F3E	75.000	75.000			
3	1	161.20500	MO	15	0	20K0F3E	5.000	5.000			

Control Points **Pt. No.**1

Address: 2801 W GRAND AVE
City: CHICAGO **County:** **State:** IL **Telephone Number:** (312)322-2865

Licensee: CHICAGO CENTRAL & PACIFIC RAILROAD

CHICAGO CENTRAL & PACIFIC RAILROAD
402 E FOURTH ST
WATERLOO, IA 50704

FCC Registration Number (FRN):
0002579365

Call Sign: WNHL632 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
07/09/2002	07/09/2002	06/16/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** CCP YARD OFFICE 200 FT S OF 33RD & 52ND AVE
City: CICERO **County:** COOK **State:** IL
Lat (NAD83): 41-49-56.1 N **Long (NAD83):** 087-45-11.2 W **ASR No.:** **Ground Elev:** 187.0

Loc. 2 **Address:** 420 W OF EJE RR BRIDGE & CCP TRACK
City: MUNGER **County:** DU PAGE **State:** IL
Lat (NAD83): 41-58-07.1 N **Long (NAD83):** 088-14-19.3 W **ASR No.:** **Ground Elev:** 232.0

Loc. 3 **Address:** MICROWAVE BLDG AT TOWER RD & CCP TRACKS
City: BURLINGTON **County:** KANE **State:** IL
Lat (NAD83): 42-02-46.1 N **Long (NAD83):** 088-29-03.3 W **ASR No.:** **Ground Elev:** 305.0

Loc. 4 **Address:** E OF CCP DEPOT 300 S OF TRACKS
City: ROCKFORD **County:** WINNEBAGO **State:** IL
Lat (NAD83): 42-15-54.1 N **Long (NAD83):** 089-06-06.4 W **ASR No.:** **Ground Elev:** 216.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.75500	FB	1	0	20K0F3E	35.000	35.000	9.0		
2	1	160.75500	FB	1	0	20K0F3E	75.000	188.000	37.0		
3	1	160.75500	FB	1	0	20K0F3E	75.000	118.000	35.0		
4	1	160.75500	FB	1	0	20K0F3E	45.000	109.000	49.0		

Control Points **Pt. No.**1
Address: 200 FT S OF 33RD AND 52ND AVE
City: CICERO **County:** **State:** IL **Telephone Number:** (312)652-0879

Licensee: Northeast Illinois Regional Commuter Railroad Corporation

FCC Registration Number (FRN): 0002849818

Call Sign: WNJS224 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

ATTN Director of Communications
Northeast Illinois Regional Commuter Railroad Corporation
547 W JACKSON BLVD
CHICAGO, IL 60661-5717

Grant Date	Effective Date	Expiration Date	Print Date
07/02/2003	07/02/2003	09/23/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 151 E RANDOLPH ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-53-04.0 N **Long (NAD83):** 087-39-26.0 W **ASR No.:** **Ground Elev:** 175.0

Loc. 2 **Address:** 1501 S CANAL
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-51-42.0 N **Long (NAD83):** 087-38-18.0 W **ASR No.:** 1061675 **Ground Elev:** 181.3

Loc. 3 **Address:** JOLIET COACH YARD
City: JOLIET **County:** WILL **State:** IL
Lat (NAD83): 41-31-27.0 N **Long (NAD83):** 088-04-21.0 W **ASR No.:** **Ground Elev:** 166.0

Loc. 4 **Area of Operation**
Operating within a 72.0 km radius around fixed location 1

Loc. 5 **Area of Operation**
Operating within a 72.0 km radius around fixed location 3

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.60500	FB	1	0	16K0F3E	40.000	120.000	6.0	4.7	
2	1	160.60500	FB	1	0	16K0F3E	40.000	120.000	11.3	12.2	
3	1	160.60500	FB	1	0	16K0F3E	40.000	135.000	46.0	17.2	
4	1	160.60500	MO	25	0	16K0F3E	40.000	40.000			
4	1	160.60500	MO	25	0	16K0F3E	5.000	5.000			
5	1	160.60500	MO	25	0	16K0F3E	40.000	40.000			
5	1	160.60500	MO	25	0	16K0F3E	5.000	5.000			

Control Points Pt. No.1

Address: 547 W JACKSON BLVD

City: CHICAGO **County:** COOK **State:** IL **Telephone Number:** (312)322-6946

Licensee: NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD CORPORATION

FCC Registration Number (FRN):
0002849818

ATTN Director of Communications
NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD CORPORATION
547 W Jackson Blvd
CHICAGO, IL 60661-5717

Call Sign: WNIY497 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
02/26/2002	12/31/2002	12/31/2011	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: VERMONT AND IRVING STS
City: BLUE ISLAND **County:** COOK **State:** IL
Lat (NAD83): 41-39-20.1 N **Long (NAD83):** 087-40-36.2 W **ASR No.:** **Ground Elev:** 184.0

Loc. 2 Area of Operation
Operating within a 80.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.60500	FB	1	0	16K0F3E	40.000	120.000	38.0		
2	1	160.60500	MO	25	0	16K0F3E	40.000	40.000			
2	1	160.60500	MO	25	0	16K0F3E	5.000	5.000			

Control Points Pt. No.1

Address: 547 W JACKSON BLVD
City: CHICAGO **County:** **State:** IL **Telephone Number:** (312)322-6909

Licensee: ILLINOIS CENTRAL GULF RAILROAD CO

FCC Registration Number (FRN):
0002849362

Call Sign: WNIZ346 **File Number:**

ATTN COMM DEPT HOMEWOOD ADMIN BLDG
ILLINOIS CENTRAL GULF RAILROAD CO
17641 S ASHLAND AVE
HOMEWOOD, IL 60430

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
06/05/2002	06/05/2002	05/28/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: INT OF DRAKE AVE & W 37TH STS EXT AT INT OF ICGRR & ATSE TRACKS

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-45-46.1 N **Long (NAD83):** 087-44-23.2 W **ASR No.:** **Ground Elev:** 181.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.92000	FB	1	0	20K0F3E	75.000	150.000	12.0		
1	1	161.19000	FB	1	0	20K0F3E	75.000	150.000	12.0		

Control Points Pt. No.1

Address: INT OF DRAKE AVE & W 37TH STS EXT AT INT OF ICGRR & ATSE TRACKS

City: CHICAGO **County:** **State:** IL **Telephone Number:** (708)206-3500

Licensee: ILLINOIS CENTRAL GULF RAILROAD CO

FCC Registration Number (FRN):
0002849362

ATTN COMM DEPT HOMEWOOD ADMIN BLDG
ILLINOIS CENTRAL GULF RAILROAD CO
17641 S ASHLAND AVE
HOMEWOOD, IL 60430

Call Sign: WNIZ346 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
06/05/2002	06/05/2002	05/28/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** INT OF DRAKE AVE & W 37TH STS EXT AT INT OF ICGRR & ATSE TRACKS

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-45-46.1 N **Long (NAD83):** 087-44-23.2 W **ASR No.:** **Ground Elev:** 181.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.92000	FB	1	0	20K0F3E	75.000	150.000	12.0		
1	1	161.19000	FB	1	0	20K0F3E	75.000	150.000	12.0		

Control Points **Pt. No.**1

Address: INT OF DRAKE AVE & W 37TH STS EXT AT INT OF ICGRR & ATSE TRACKS

City: CHICAGO **County:** **State:** IL **Telephone Number:** (708)206-3500

Licensee: Northeast Illinois Regional Commuter Railroad Corporation

FCC Registration Number (FRN): 0002849818

Call Sign: WNJS224 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

ATTN Director of Communications
Northeast Illinois Regional Commuter Railroad Corporation
547 W JACKSON BLVD
CHICAGO, IL 60661-5717

Grant Date	Effective Date	Expiration Date	Print Date
07/02/2003	07/02/2003	09/23/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 151 E RANDOLPH ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-53-04.0 N **Long (NAD83):** 087-39-26.0 W **ASR No.:** **Ground Elev:** 175.0

Loc. 2 Address: 1501 S CANAL
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-51-42.0 N **Long (NAD83):** 087-38-18.0 W **ASR No.:** 1061675 **Ground Elev:** 181.3

Loc. 3 Address: JOLIET COACH YARD
City: JOLIET **County:** WILL **State:** IL
Lat (NAD83): 41-31-27.0 N **Long (NAD83):** 088-04-21.0 W **ASR No.:** **Ground Elev:** 166.0

Loc. 4 Area of Operation
Operating within a 72.0 km radius around fixed location 1

Loc. 5 Area of Operation
Operating within a 72.0 km radius around fixed location 3

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.60500	FB	1	0	16K0F3E	40.000	120.000	6.0	4.7	
2	1	160.60500	FB	1	0	16K0F3E	40.000	120.000	11.3	12.2	
3	1	160.60500	FB	1	0	16K0F3E	40.000	135.000	46.0	17.2	
4	1	160.60500	MO	25	0	16K0F3E	40.000	40.000			
4	1	160.60500	MO	25	0	16K0F3E	5.000	5.000			
5	1	160.60500	MO	25	0	16K0F3E	40.000	40.000			
5	1	160.60500	MO	25	0	16K0F3E	5.000	5.000			

Control Points Pt. No.1

Address: 547 W JACKSON BLVD
City: CHICAGO **County:** COOK **State:** IL **Telephone Number:** (312)322-6946

Licensee: Norfolk Southern Railway Company

ATTN J R CELIO
Norfolk Southern Railway Company
99 Spring St., Box 123
Atlanta, GA 30303

FCC Registration Number (FRN):
0004228979

Call Sign: WNKX352 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
02/13/2003	02/13/2003	02/19/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** P&SS OFC 2040 E 106TH ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-42-27.1 N **Long (NAD83):** 087-34-35.2 W **ASR No.:** N/A **Ground Elev:** 180.0

Loc. 2 **Address:** P&SS OFC 2040 E 106TH ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-42-27.1 N **Long (NAD83):** 087-34-37.2 W **ASR No.:** **Ground Elev:** 180.0

Loc. 3 **Area of Operation**
Operating within a 40.0 km radius around fixed location 2

Loc. 4 **Address:** RR YARD OFC, 4016 ASHLAND AVE
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-49-16.1 N **Long (NAD83):** 087-40-03.1 W **ASR No.:** **Ground Elev:** 181.0

Loc. 5 **Area of Operation**
Operating within a 25.0 km radius around fixed location 4

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.44000	FB	1	0	20K0F3E	35.000	30.000	15.0	13.0	
1	1	160.62000	FB	1	0	20K0F3E	35.000	30.000	15.0	13.0	
1	1	161.25000	FB	1	0	20K0F3E	35.000	30.000	15.0	13.0	
2	1	160.54500	FB2	1	0	20K0F3E	60.000	139.000	40.0	38.0	
2	2	160.80000	FB	1	0	20K0F3E	60.000	150.000	40.0	38.4	02/12/2004
3	1	160.54500	MO	60	0	20K0F3E	40.000	40.000			
3	1	161.20500	MO	60	0	20K0F3E	40.000	40.000			
4	1	160.54500	FB	1	0	20K0F3E	60.000	150.000	24.4	22.8	02/12/2004
5	1	160.54500	MO	25	0	20K0F3E	60.000	60.000			02/12/2004
5	1	161.20500	MO	25	0	20K0F3E	60.000	60.000			02/12/2004

Control Points Pt. No 1

Control Points **Pt. No.1**

Address: DISPATCHER OFC, 17301 MICHIGA AVE

City: DEARORN **County:** WAYNE **State:** MI **Telephone Number:** (313)323-5806

Pt. No.2

Address: P&SS OFC 2030 E 106TH ST

City: CHICAGO **County:** COOK **State:** IL **Telephone Number:** (773)933-8042

Licensee: NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD CORPORATION

FCC Registration Number (FRN): 0002849818

ATTN COMMUNICATIONS ENGR
NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD CORPORATION
547 W JACKSON BLVD
CHICAGO, IL 60606

Call Sign: WNJW288 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
06/17/1997	06/17/1997	09/03/2002	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 2801 W GRAND
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-53-35.1 N **Long (NAD83):** 087-41-46.2 W **ASR No.:** **Ground Elev:** 181.0

Loc. 2 **Address:** ELGIN DEPOT 109 W LAKE ST
City: ELGIN **County:** KANE **State:** IL
Lat (NAD83): 42-02-13.1 N **Long (NAD83):** 088-16-56.3 W **ASR No.:** **Ground Elev:** 223.0

Loc. 3 **Address:** FOX LAKE NIPPERSINK GRAND
City: FOX LAKE **County:** LAKE **State:** IL
Lat (NAD83): 42-23-53.1 N **Long (NAD83):** 088-10-56.3 W **ASR No.:** **Ground Elev:** 229.0

Loc. 4 **Address:** WOODDALE STA IRVING PARK RD & OAK ST
City: WOODDALE **County:** DU PAGE **State:** IL
Lat (NAD83): 41-57-42.1 N **Long (NAD83):** 087-58-31.2 W **ASR No.:** **Ground Elev:** 210.0

Loc. 5 **Address:** 860 DEERFIELD RD
City: DEERFIELD **County:** LAKE **State:** IL
Lat (NAD83): 42-10-03.1 N **Long (NAD83):** 087-51-00.2 W **ASR No.:** **Ground Elev:** 210.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.60500	FB	1	0	20K0F3E	75.000	200.000	27.0		
2	1	160.60500	FB	1	0	20K0F3E	40.000	75.000	15.0		
3	1	160.60500	FB	1	0	20K0F3E	40.000	75.000	15.0		
4	1	160.60500	FB	1	0	20K0F3E	40.000	75.000	15.0		
5	1	160.60500	FB	1	0	20K0F3E	40.000	75.000	15.0		

Control Points **Pt. No.**1

Address: 2801 W GRAND AVE

City: CHICAGO County: State: IL Telephone Number: (312)322-2831

Licensee: ILLINOIS CENTRAL GULF RAILROAD CO

ATTN COMM DEPT HOMEWOOD ADMIN BLDG
ILLINOIS CENTRAL GULF RAILROAD CO
17641 S ASHLAND AVE
HOMEWOOD, IL 60430

FCC Registration Number (FRN):
0002849362

Call Sign: WNJY220

File Number:

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
07/25/2002	07/25/2002	09/16/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** ILLINOIS CENTRAL GULF RR GLEN YARD

City: STICKNEY **County:** COOK **State:** IL

Lat (NAD83): 41-48-19.1 N **Long (NAD83):** 087-46-40.2 W **ASR No.:** **Ground Elev:** 120.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.92000	FB	1	0	20K0F3E	75.000	350.000	37.0	0.0	
1	1	161.19000	FB	1	0	20K0F3E	75.000	350.000	37.0	0.0	
1	1	161.20500	FB	1	0	20K0F3E	75.000	350.000	37.0	0.0	
1	1	161.29500	FB	1	0	20K0F3E	75.000	350.000	37.0	0.0	

Control Points **Pt. No.1**

Address: 233 N MICHIGAN AVE

Licensee: The Burlington Northern and Santa Fe Railway Co

FCC Registration Number (FRN):
0004772877

Call Sign: WPFK523 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

ATTN T EL E C O M
The Burlington Northern and Santa Fe Railway Co
4515 KANSAS AVE
KANSAS CITY, KS 66106

Grant Date	Effective Date	Expiration Date	Print Date
07/07/2004	07/07/2004	08/01/2014	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 7600 SANTA FE DR BLDG A ADMIN
City: HODGKINS **County:** COOK **State:** IL
Lat (NAD83): 41-45-03.1 N **Long (NAD83):** 087-52-12.2 W **ASR No.:** N/A **Ground Elev:** 184.0

Loc. 2 **Address:** 7600 SANTA FE DR BLDG B MECHANICAL
City: HODGKINS **County:** COOK **State:** IL
Lat (NAD83): 41-45-18.1 N **Long (NAD83):** 087-51-46.2 W **ASR No.:** N/A **Ground Elev:** 183.0

Loc. 3 **Address:** 7600 SANTA FE DR BLDG C OPERATIONS TWR
City: HODGKINS **County:** COOK **State:** IL
Lat (NAD83): 41-44-48.1 N **Long (NAD83):** 087-52-25.2 W **ASR No.:** N/A **Ground Elev:** 184.0

Loc. 4 **Area of Operation**
Operating within a 8.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.65000	FB	1	0	20K0F3E	50.000	50.000	8.0		
1	1	160.99500	FB	1	0	20K0F3E	50.000	50.000	8.0		
1	1	161.20500	FB	1	0	20K0F3E	50.000	50.000	8.0		
2	1	160.65000	FB	1	0	20K0F3E	50.000	200.000	17.0		
2	1	160.99500	FB	1	0	20K0F3E	50.000	200.000	17.0		
3	1	160.65000	FB	1	0	20K0F3E	50.000	50.000	15.0		
3	1	160.99500	FB	1	0	20K0F3E	50.000	50.000	15.0		
4	1	160.65000	MO	40	0	20K0F3E	45.000				
4	1	160.99500	MO	40	0	20K0F3E	45.000				
4	1	161.20500	MO	5	0	20K0F3E	45.000				

Control Points Pt. No.1

Address: 7600 SANTA FE DR BLDG A ADMIN

City: HODGKINS **County:** **State:** IL **Telephone Number:**

Licensee: NATIONAL RAILROAD PASSENGER CORP

FCC Registration Number (FRN):
0002159770

Call Sign: WPCT556 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

ATTN AMTRAK RADIO ENGINEERING
NATIONAL RAILROAD PASSENGER CORP
30TH ST STA BOX 41
PHILADELPHIA, PA 19104

Grant Date	Effective Date	Expiration Date	Print Date
06/20/2003	06/20/2003	07/27/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 210 S CANAL ST

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-52-43.1 N **Long (NAD83):** 087-38-25.2 W **ASR No.:** N/A **Ground Elev:** 181.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.30500	FB	1	0	20K0F3E	10.000	12.600	2.0		

Control Points Pt. No.1

Address: AMTRAK PASS SERV OFC

City: CHICAGO **County:** **State:** IL **Telephone Number:** (312)655-2099

Licensee: NORTHERN INDIANA COMMUTER TRANSPORTATION DISTRICT

FCC Registration Number (FRN):
0008050064

Call Sign: WPCD967 **File Number:**

ATTN VICTOR BABIN
NORTHERN INDIANA COMMUTER TRANSPORTATION DISTRICT
601 N ROESKE AVE
MICHIGAN CITY, IN 46360

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
02/19/2003	02/19/2003	05/04/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 5615 INDIANAPOLIS BLVD
City: EAST CHICAGO **County:** LAKE **State:** IN
Lat (NAD83): 41-36-32.1 N **Long (NAD83):** 087-28-41.1 W **ASR No.:** N/A **Ground Elev:** 179.0

Loc. 2 **Address:** 305 N CARROLL AVE RR SHOPS & YARD
City: MICHIGAN CITY **County:** LA PORTE **State:** IN
Lat (NAD83): 41-42-25.1 N **Long (NAD83):** 086-51-35.1 W **ASR No.:** N/A **Ground Elev:** 187.0

Loc. 3 **Address:** SMILAS RD & NICTD TRACKS
City: NEW CARLISLE **County:** LA PORTE **State:** IN
Lat (NAD83): 41-42-15.2 N **Long (NAD83):** 086-27-00.1 W **ASR No.:** N/A **Ground Elev:** 224.0

Loc. 4 **Area of Operation**
Operating within a 40.0 km radius around
41-36-32.1 N, 087-28-58.1 W

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.35500	FB2	1	50	16K0F3E	70.000	160.000	40.0	37.0	
2	1	161.01000	FX1	1	0	16K0F3E	60.000	202.000	40.0	30.0	
2	1	161.35500	FB2	1	50	16K0F3E	60.000	202.000	40.0	30.0	
3	1	161.35500	FB2	1	50	16K0F3E	70.000	232.000	24.0	21.0	
4	1	161.01000	MO	185	0	16K0F3E	45.000				
4	1	161.02500	MO	185	0	16K0F3E	45.000				
4	1	161.10000	MO	185	0	16K0F3E	45.000				
4	1	161.35500	MO	185	0	16K0F3E	45.000				

Control Points **Pt. No.**1
Address: 5710 CLINE AVE
City: HAMMOND **County:** **State:** IN **Telephone Number:** (219)874-4221

Licensee: The Burlington Northern and Santa Fe Railway Company

ATTN Robert Leedham
The Burlington Northern and Santa Fe Railway Company
4515 KANSAS AVE
KANSAS CITY, KS 66106

FCC Registration Number (FRN): 0004772877

Call Sign: WNXK890 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
09/01/2001	09/01/2001	10/01/2011	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 720 W 16TH ST

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-51-36.1 N **Long (NAD83):** 087-38-43.2 W **ASR No.:** **Ground Elev:** 186.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.10000	FB	1	0	20K0F3E	75.000	180.000	17.0		

Control Points Pt. No.1

Address: 720 W 16TH ST

City: CHICAGO **County:** **State:** IL **Telephone Number:** (312)850-5650

Licensee: GRAND TRUNK WESTERN RAILROAD

FCC Registration Number (FRN): 0003688876

Call Sign: WNWV511 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

ATTN COMMUNICATIONS DEPT / Mark Ryon
GRAND TRUNK WESTERN RAILROAD
700 Pershing Ave
PONTIAC, MI 48340-2365

Grant Date	Effective Date	Expiration Date	Print Date
07/17/2001	07/17/2001	07/16/2011	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: GTW RAILWAY POLICE 2075 W 43RD ST

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-48-56.1 N **Long (NAD83):** 087-40-46.2 W **ASR No.:** **Ground Elev:** 180.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.90500	FB	1	0	20K0F3E	50.000	240.000	15.0		

Control Points Pt. No.1

Address: GTW RAILWAY POLICE 2075 W 43RD ST

City: CHICAGO **County:** **State:** IL **Telephone Number:** (313)396-6602

Licensee: Northeast Illinois Regional Commuter Railroad Corporation

FCC Registration Number (FRN): 0002849818

Call Sign: WNVF806 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

ATTN Director of Communications
Northeast Illinois Regional Commuter Railroad Corporation
547 W JACKSON BLVD
CHICAGO, IL 60661-5717

Grant Date	Effective Date	Expiration Date	Print Date
11/01/2000	12/31/2002	01/15/2006	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 2801 W GRAND AVE
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-53-40.1 N **Long (NAD83):** 087-41-58.2 W **ASR No.:** **Ground Elev:** 182.0

Loc. 2 Address: 109 W LAKE ST
City: ELGIN **County:** KANE **State:** IL
Lat (NAD83): 42-02-13.1 N **Long (NAD83):** 088-16-56.3 W **ASR No.:** **Ground Elev:** 223.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.52000	FB	1	0	20K0F3E	20.000	60.000	14.0	0.0	
2	1	161.52000	FB	1	0	20K0F3E	40.000	75.000	11.0	0.0	

Control Points Pt. No.1
Address: 2801 W GRAND AVE
City: CHICAGO **County:** **State:** IL **Telephone Number:** (312)322-2866

Licensee: Norfolk Southern Railway Company

FCC Registration Number (FRN): 0004228979

Call Sign: WNUY884 **File Number:**

ATTN COMMUNICATIONS AND SIGNAL DEPT
Norfolk Southern Railway Company
99 Spring St., Box 123
Atlanta, GA 30303

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
10/17/2000	03/02/2001	12/11/2005	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: INT OF YATES BLVD & E 103RD ST CALUMET

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-42-27.1 N **Long (NAD83):** 087-34-37.2 W **ASR No.:** **Ground Elev:** 178.0

Loc. 2 Area of Operation
Operating within a 80.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.36500	FB2	1	0	20K0F3E	75.000	178.000	23.0	0.0	
2	1	161.44500	MO	100	0	20K0F3E	30.000				

Control Points Pt. No.1

Address: INT OF YATES BLVD & E 103RD ST CALUMET

City: CHICAGO **County:** **State:** IL **Telephone Number:** (219)493-5369

Licensee: Northeast Illinois Regional Commuter Railroad Corp

FCC Registration Number (FRN):
0002849818

Call Sign: WNQU573
File Number:

ATTN COMMUNICATIONS DIRECTOR
Northeast Illinois Regional Commuter Railroad Corp
547 W JACKSON BLVD
CHICAGO, IL 60606

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
09/13/1999	02/13/2003	11/15/2004	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 59TH ST & C&WI TRACKS
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-47-09.6 N **Long (NAD83):** 087-38-24.5 W **ASR No.:** **Ground Elev:** 181.4

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.44000	FB	1	0	20K0F3E	40.000	40.000	19.5	20.5	

Control Points Pt. No.1
Address: 1501 S CANAL
City: CHICAGO **County:** COOK **State:** IL **Telephone Number:** (312)322-2858

Licensee: GRAND TRUNK WESTERN RAILROAD

FCC Registration Number (FRN): 0003688876

ATTN COMMUNICATIONS- Terry Woolston
GRAND TRUNK WESTERN RAILROAD
700 PERSHING Ave
PONTIAC, MI 48340-2365

Call Sign: WNMY441 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
01/20/2004	01/20/2004	10/31/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: GTW RAILPORT 2075 W 43RD ST

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-48-56.1 N **Long (NAD83):** 087-40-46.2 W **ASR No.:** **Ground Elev:** 180.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.53000	FB	1	0	20K0F3E	60.000	120.000	15.0		
1	1	160.59000	FB	1	0	20K0F3E	60.000	120.000	15.0		
1	1	160.84500	FB	1	0	20K0F3E	60.000	120.000	15.0		
1	1	160.95000	FB	1	0	20K0F3E	60.000	120.000	15.0		

Control Points Pt. No.1

Address: GTW RAILPORT 2075 W 43RD ST

City: CHICAGO **County:** **State:** IL **Telephone Number:** (248)452-4750

Licensee: GRAND TRUNK WESTERN RAILROAD

FCC Registration Number (FRN):
0003688876

Call Sign: WNMY439 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

ATTN COMMUNICATIONS- Terry Woolston
GRAND TRUNK WESTERN RAILROAD
700 PERSHING Ave
PONTIAC, MI 48340-2365

Grant Date	Effective Date	Expiration Date	Print Date
01/20/2004	01/20/2004	10/31/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: MICROWAVE SHELTER WJZ79 51ST STT & GTW TRACKS

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-48-01.1 N **Long (NAD83):** 087-42-46.2 W **ASR No.:** **Ground Elev:** 183.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.53000	FB	1	0	20K0F3E	60.000	210.000	37.0		
1	1	160.59000	FB	1	0	20K0F3E	60.000	210.000	37.0		
1	1	160.84500	FB	1	0	20K0F3E	60.000	210.000	37.0		
1	1	160.95000	FB	1	0	20K0F3E	60.000	210.000	37.0		

Control Points Pt. No.1

Address: GTW RAILPORT 2075 W 43RD ST

City: CHICAGO **County:** **State:** IL **Telephone Number:** (248)452-4750

Licensee: Northeast Illinois Regional Commuter Railroad Corporation

FCC Registration Number (FRN):
0002849818

Call Sign: WNMV660 **File Number:**

ATTN Director of Communications
Northeast Illinois Regional Commuter Railroad Corporation
547 W JACKSON BLVD
CHICAGO, IL 60661-5717

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
07/10/2003	07/10/2003	10/05/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 219TH AND RITCHTON RD
City: MATTESON **County:** COOK **State:** IL
Lat (NAD83): 41-29-35.1 N **Long (NAD83):** 087-42-20.2 W **ASR No.:** N/A **Ground Elev:** 215.0

Loc. 2 Address: 18TH ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-51-30.1 N **Long (NAD83):** 087-37-15.2 W **ASR No.:** N/A **Ground Elev:** 181.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.02500	FB	1	0	20K0F3E	25.000	100.000	27.0		
2	1	161.02500	FB	1	0	20K0F3E	75.000	150.000	16.0		

Control Points Pt. No.1

Address: 547 W JACKSON BLVD
City: CHICAGO **County:** **State:** IL **Telephone Number:** (312)322-8263

Licensee: CHICAGO CENTRAL & PACIFIC RAILROAD CO

ATTN COMMUNICATIONS DEPT
CHICAGO CENTRAL & PACIFIC RAILROAD CO
17641 S ASHLAND AVE
HOMEWOOD, IL 60430

FCC Registration Number (FRN): 0002579365

Call Sign: WNLF924 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
08/26/2003	08/26/2003	08/25/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** N OF 34TH ST 590 E CENTRAL

City: CICERO **County:** COOK **State:** IL

Lat (NAD83): 41-49-52.1 N **Long (NAD83):** 087-45-41.2 W **ASR No.:** **Ground Elev:** 183.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.75500	FB	1	0	20K0F3E	75.000	188.000	23.0	19.0	
1	1	161.19000	FB	1	0	20K0F3E	75.000	188.000	23.0	19.0	

Control Points **Pt. No.1**

Address: 17641 A ASHLAND AVE

City: HOMEWOOD **County:** **State:** IL **Telephone Number:** (708)206-3500

Licensee: Soo Systems Radio Communications Corporation

FCC Registration Number (FRN):
0002606689

ATTN James C Thomas
Soo Systems Radio Communications Corporation
PO Box 530
501 Marquette Ave
MINNEAPOLIS, MN 55402

Call Sign: WPAS786 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
07/13/2002	07/13/2002	09/29/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 9665 W LAWRENCE

City: SCHILLER PARK **County:** COOK **State:** IL

Lat (NAD83): 41-57-56.1 N **Long (NAD83):** 087-52-07.2 W **ASR No.:** N/A **Ground Elev:** 193.0

Loc. 2 **Area of Operation**
Operating within a 8.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.14500	FB	1	0	20K0F3E	10.000	15.000	8.0		
1	1	161.43000	FB	1	0	20K0F3E	10.000	15.000	8.0		
2	1	161.14500	MO	5	0	20K0F3E	10.000	10.000			

Control Points **Pt. No.1**

Address: 9665 W LAWRENCE

City: SCHILLER PARK **County:** **State:** IL **Telephone Number:** (630)860-4194

Licensee: CSX TRANSPORTATION INC

ATTN T C MILLER
CSX TRANSPORTATION INC
5220 BELFORT RD STE 300
JACKSONVILLE, FL 32256

FCC Registration Number (FRN): 0002036325

Call Sign: WPRK561 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
10/31/2000	10/31/2000	10/31/2005	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** .31 MI SW OF S HARLEM AVE XING CSXT
City: BEDFORD PARK **County:** COOK **State:** IL
Lat (NAD83): 41-46-02.1 N **Long (NAD83):** 087-48-38.2 W **ASR No.:** N/A **Ground Elev:** 187.0

Loc. 2 **Address:** 195 NE OF W 87TH ST XING CSXT
City: BRIDGEVIEW **County:** COOK **State:** IL
Lat (NAD83): 41-44-01.1 N **Long (NAD83):** 087-48-31.2 W **ASR No.:** N/A **Ground Elev:** 188.0

Loc. 3 **Address:** 684 SE OF S KOSTNER AVE XING CSXT
City: ALSIP **County:** COOK **State:** IL
Lat (NAD83): 41-40-15.1 N **Long (NAD83):** 087-43-38.2 W **ASR No.:** N/A **Ground Elev:** 178.0

Loc. 4 **Address:** 455 SW OF DES PLAINES & VINE STS
City: BLUE ISLAND **County:** COOK **State:** IL
Lat (NAD83): 41-38-55.1 N **Long (NAD83):** 087-41-10.2 W **ASR No.:** N/A **Ground Elev:** 178.0

Loc. 5 **Address:** 784 NW OF OXFORD AVE XING CSXT
City: CHICAGO RIDGE **County:** COOK **State:** IL
Lat (NAD83): 41-42-21.1 N **Long (NAD83):** 087-46-43.2 W **ASR No.:** N/A **Ground Elev:** 178.0

Loc. 6 **Address:** 887 NE OF INDIANA AVE
City: DOLTON **County:** COOK **State:** IL
Lat (NAD83): 41-38-30.1 N **Long (NAD83):** 087-36-51.2 W **ASR No.:** N/A **Ground Elev:** 179.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.23000	FB	1	0	20K0F3E	20.000	36.000	17.0	11.0	
1	1	160.29000	FB	1	0	20K0F3E	20.000	36.000	17.0	11.0	
1	1	160.78500	FB	1	0	20K0F3E	20.000	36.000	17.0	11.0	
2	1	160.23000	FB	1	0	20K0F3E	20.000	36.000	17.0	11.0	
2	1	160.29000	FB	1	0	20K0F3E	20.000	36.000	17.0	11.0	

2	1	160.78500	FB	1	0	20K0F3E	20.000	36.000	17.0	11.0
3	1	160.23000	FB	1	0	20K0F3E	20.000	36.000	17.0	3.0
3	1	160.29000	FB	1	0	20K0F3E	20.000	36.000	17.0	3.0
3	1	160.78500	FB	1	0	20K0F3E	20.000	36.000	17.0	3.0
4	1	160.23000	FB	1	0	20K0F3E	20.000	36.000	17.0	5.0
4	1	160.32000	FB	1	0	20K0F3E	20.000	36.000	17.0	5.0
4	1	160.78500	FB	1	0	20K0F3E	20.000	36.000	17.0	5.0
5	1	160.23000	FB	1	0	20K0F3E	20.000	36.000	17.0	2.0
5	1	160.29000	FB	1	0	20K0F3E	20.000	36.000	17.0	2.0
5	1	160.78500	FB	1	0	20K0F3E	20.000	36.000	17.0	2.0
6	1	160.23000	FB	1	0	20K0F3E	20.000	36.000	17.0	11.0
6	1	160.32000	FB	1	0	20K0F3E	20.000	36.000	17.0	11.0
6	1	160.78500	FB	1	0	20K0F3E	20.000	36.000	17.0	11.0

Control Points **Pt. No.**1

Address: DISPATCHER CTR 3019 WARRINGTON ST

City: JACKSONVILLE **County:** **State:** FL **Telephone Number:** (904)388-2180

Licensee: Soo Systems Radio Communications Corporation

FCC Registration Number (FRN):
0002606689

Call Sign: WPMZ858 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

ATTN James C Thomas
Soo Systems Radio Communications Corporation
501 Marquette Ave
MINNEAPOLIS, MN 55402

Grant Date	Effective Date	Expiration Date	Print Date
01/31/2004	01/31/2004	04/15/2014	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: CP RAILWAY BENSENVILLE YARD OFFICE 11306 FRANKLIN AVE

City: FRANKLIN PARK **County:** COOK **State:** IL

Lat (NAD83): 41-56-51.1 N **Long (NAD83):** 087-54-32.2 W **ASR No.:** N/A **Ground Elev:** 202.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.39500	FB	3	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	160.47000	FB	3	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	160.50000	FB	1	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	160.51500	FB	2	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	160.59000	FB	1	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	160.62000	FB	2	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	160.77000	FB	3	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	160.98000	FB	2	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	161.08500	FB	4	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	161.14500	FB	1	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	161.19000	FB	1	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	161.20500	FB	1	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	161.23500	FB	1	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	161.43000	FB	4	0	20K0F3E	30.000	55.000	12.0	12.0	
1	1	161.52000	FB	4	0	20K0F3E	30.000	55.000	12.0	12.0	

Control Points Pt. No.1

Address: CP RAIL YARD OFC 11306 FRANKLIN AVE

City: FRANKLIN PARK **County:** COOK **State:** IL **Telephone Number:** (612)904-6111

Licensee: Norfolk Southern Railway Company

FCC Registration Number (FRN):
0004228979

Call Sign: WPMQ905 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

ATTN COMMUNICATIONS AND SIGNAL DEPT
Norfolk Southern Railway Company
99 Spring St., Box 123
Atlanta, GA 30303

Grant Date	Effective Date	Expiration Date	Print Date
09/20/2003	09/20/2003	11/12/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** SOUTH END OF CUMMINGS DRAWBRIDGE

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-39-54.1 N **Long (NAD83):** 087-33-53.2 W **ASR No.:** N/A **Ground Elev:** 180.0

Loc. 2 **Area of Operation**
Operating within a 32.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.40000	FB	1	0	20K0F3E	30.000	52.000	29.0	28.0	
2	1	161.40000	MO	50	0	20K0F3E	40.000	40.000			

Control Points **Pt. No.**1

Address: 2040 E 106TH ST

City: CHICAGO **County:** **State:** IL **Telephone Number:** (800)448-4385

Licensee: PENNSYLVANIA LINES LLC

ATTN J R CELIO
PENNSYLVANIA LINES LLC
99 SPRING ST SW BOX 123
ATLANTA, GA 30303

FCC Registration Number (FRN):
0004142501

Call Sign: WPGP395

File Number:

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
02/14/2000	12/04/2002	02/16/2005	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** CR NORMAL YADS 55TH ST & NORMAL ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-47-40.1 N **Long (NAD83):** 087-38-08.2 W **ASR No.:** N/A **Ground Elev:** 180.0

Loc. 2 **Address:** RR YARD OFC 40TH & ASHLAND AVE
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-49-16.1 N **Long (NAD83):** 087-40-03.1 W **ASR No.:** N/A **Ground Elev:** 181.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.80000	FB	1	0	20K0F3E	60.000	68.000	12.0		
1	1	160.86000	FB	1	0	20K0F3E	60.000	68.000	12.0		
1	1	161.07000	FB	1	0	20K0F3E	60.000	68.000	12.0		
2	1	160.44000	FB	1	0	20K0F3E	60.000	68.000	12.0	11.0	
2	1	160.75500	FB	1	0	20K0F3E	60.000	68.000	12.0	11.0	
2	1	160.80000	FB	1	0	20K0F3E	60.000	68.000	12.0	11.0	
2	1	160.86000	FB	1	0	20K0F3E	60.000	68.000	12.0	11.0	
2	1	160.89000	FB	1	0	20K0F3E	60.000	68.000	12.0	11.0	
2	1	160.98000	FB	1	0	20K0F3E	60.000	68.000	12.0	11.0	
2	1	161.07000	FB	1	0	20K0F3E	60.000	68.000	12.0	11.0	
2	1	161.10000	FB	1	0	20K0F3E	60.000	68.000	12.0	11.0	
2	1	161.29500	FB	1	0	20K0F3E	60.000	68.000	12.0	11.0	

Control Points **Pt. No.**1
Address: RR Yard Ofc, Ashland Ave
City: CHICAGO **County:** COOK **State:** IL **Telephone Number:** (773)557-9285

Licensee: NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD CORPORATION

FCC Registration Number (FRN): 0002849818

ATTN Director of Communications
NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD CORPORATION
547 W JACKSON BLVD
CHICAGO, IL 60661-5717

Call Sign: WPFZ208

File Number:

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
09/15/1999	12/31/2002	11/30/2004	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 210 S CANAL ST UNION STA

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-52-45.1 N **Long (NAD83):** 087-38-19.2 W **ASR No.:** N/A **Ground Elev:** 175.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.60500	FB	1	0	16K0F3E	45.000	50.000	5.0		

Control Points **Pt. No.**1

Address: ENGINEERING DEPT 547 W JACKSON BLVD 4TH FLR

City: CHICAGO **County:** **State:** IL **Telephone Number:** (312)322-8263

Licensee: CSX TRANSPORTATION INC

FCC Registration Number (FRN): 0002036325

Call Sign: WPRK560 **File Number:**

ATTN T C MILLER
CSX TRANSPORTATION INC
5220 BELFORT RD STE 300
JACKSONVILLE, FL 32256

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
10/31/2000	10/31/2000	10/31/2005	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 667 SE OF SR 1 XING CSXT
City: RIVERDALE **County:** COOK **State:** IL
Lat (NAD83): 41-38-52.1 N **Long (NAD83):** 087-38-20.2 W **ASR No.:** N/A **Ground Elev:** 179.0

Loc. 2 Address: .26 MI SE OF SR 43 & S HARLEM AVE
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-45-52.1 N **Long (NAD83):** 087-47-44.2 W **ASR No.:** N/A **Ground Elev:** 187.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.23000	FB	1	0	20K0F3E	35.000	100.000	47.0	40.0	
1	1	160.29000	FB	1	0	20K0F3E	35.000	100.000	47.0	40.0	
1	1	160.78500	FB	1	0	20K0F3E	35.000	100.000	47.0	40.0	
2	1	160.23000	FB	1	0	20K0F3E	35.000	120.000	21.0	16.0	
2	1	160.32000	FB	1	0	20K0F3E	35.000	120.000	21.0	16.0	
2	1	160.78500	FB	1	0	20K0F3E	35.000	120.000	21.0	16.0	

Control Points Pt. No.1

Address: DISPATCHER CTR 3019 WARRINGTON ST
City: JACKSONVILLE **County:** **State:** FL **Telephone Number:** (904)388-2180

Licensee: CSX INTERMODAL

FCC Registration Number (FRN):

Call Sign: WPRL451 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

ATTN STEVE KLUGE
CSX INTERMODAL
7000 W 71ST ST
BEDFORD PARK, IL 60638

Grant Date	Effective Date	Expiration Date	Print Date
11/08/2000	11/08/2000	11/08/2005	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 7000 W 71ST ST

City: BEDFORD PARK **County:** COOK **State:** IL

Lat (NAD83): 41-45-42.1 N **Long (NAD83):** 087-47-48.2 W **ASR No.:** N/A **Ground Elev:** 187.0

Loc. 2 **Area of Operation**
Operating within a 8.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.27500	FB2	1	0	20K0F3E	20.000	28.000	17.0	12.0	
2	1	152.94500	MO	100	0	20K0F3E	25.000				
2	1	160.27500	MO	100	0	20K0F3E	25.000				

Control Points **Pt. No.**1

Address: 7000 W 71ST ST

City: BEDFORD PARK **County:** **State:** IL **Telephone Number:** (708)563-3908

Licensee: National Railroad Passenger Corporation, dba AMTRAK

FCC Registration Number (FRN):
0002159770

Call Sign: WPTX382

File Number:

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

ATTN J H McConaghy
National Railroad Passenger Corporation, dba AMTRAK
30th Street Station Box 41
Philadelphia, PA 19104

Grant Date	Effective Date	Expiration Date	Print Date
01/07/2002	01/07/2002	01/07/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 210 S. CANAL STREET

City: CHICAGO **County:** COOK **State:** IL

Lat (NAD83): 41-52-43.1 N **Long (NAD83):** 087-38-25.2 W **ASR No.:** **Ground Elev:** 181.0

Loc. 2 Area of Operation
Operating within a 40.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.32500	FB	1	0	20K0F3E	75.000	120.000	35.0	-84.9	01/07/2003
2	1	160.39500	MO	100	0	20K0F3E	75.000	75.000			01/07/2003

Control Points Pt. No.1

Address: 30th STREET STATION

City: PHILADELPHIA **County:** PHILADELPHIA **State:** PA **Telephone Number:** (215)349-4000

Licensee: Chicago Rail Link

FCC Registration Number (FRN):
0006917793

Call Sign: WPVA811 **File Number:**

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

ATTN Mark Piotrowski
Chicago Rail Link
2728 E 104th St
Chicago, IL 60617

Grant Date	Effective Date	Expiration Date	Print Date
06/10/2002	06/10/2002	06/10/2012	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 2728 E 104th St
City: Chicago **County:** COOK **State:** IL
Lat (NAD83): 41-42-23.6 N **Long (NAD83):** 087-33-26.1 W **ASR No.:** **Ground Elev:** 179.0

Loc. 2 Area of Operation
Operating within a 16.0 km radius around fixed location 1

Loc. 3 Area of Operation
Operating within a 16.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.93500	FB	1	0	11K2F3E	45.000	75.000	9.1	8.9	06/10/2003
2	1	160.93500	MO	15	0	11K2F3E	4.000	4.000			06/10/2003
3	1	160.93500	MO	16	0	11K2F3E	35.000	35.000			06/10/2003

Control Points Pt. No.1

Address: 2728 E 104th St
City: Chicago **County:** COOK **State:** IL **Telephone Number:** (773)978-8638

Licensee: CSX Transportation Inc

FCC Registration Number (FRN): 0002036325

Call Sign: WPZI679 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

ATTN T C Miller
CSX Transportation Inc
5220 Belfort Road Suite 300
Jacksonville, FL 32256

Grant Date	Effective Date	Expiration Date	Print Date
01/16/2004	01/16/2004	01/16/2014	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 300' SW OF INT OF W81ST AND S. OAKLEY AVE. ALONG CSX ROW
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-44-41.1 N **Long (NAD83):** 087-40-52.0 W **ASR No.:** **Ground Elev:** 188.1

Loc. 2 **Address:** 454' E OF INT OF 75TH ST. AND S. OAKLEY AVE ALONG CSX ROW
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-45-28.0 N **Long (NAD83):** 087-40-42.9 W **ASR No.:** **Ground Elev:** 185.0

Loc. 3 **Address:** 130' NW OF INT OF S. BRAINARD AVE AND SR 312 ALONG CSX ROW
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-37-58.0 N **Long (NAD83):** 087-31-29.9 W **ASR No.:** **Ground Elev:** 178.9

Loc. 4 **Address:** 520' E OF SR 43 ALONG CSX ROW
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-45-59.4 N **Long (NAD83):** 087-47-50.0 W **ASR No.:** **Ground Elev:** 187.1

Loc. 5 **Address:** 228' W OF LEAVITT AVE.
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-38-22.2 N **Long (NAD83):** 087-40-17.8 W **ASR No.:** **Ground Elev:** 182.9

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.23000	FB	1	0	20K0F3E	20.000	30.000	15.8	20.6	01/16/2005
1	1	160.29000	FB	1	0	20K0F3E	20.000	30.000	15.8	20.6	01/16/2005
1	1	160.32000	FB	1	0	20K0F3E	20.000	30.000	15.8	20.6	01/16/2005
1	1	160.78500	FB	1	0	20K0F3E	20.000	30.000	15.8	20.6	01/16/2005
2	1	160.23000	FB	1	0	20K0F3E	20.000	30.000	15.8	17.7	01/16/2005
2	1	160.29000	FB	1	0	20K0F3E	20.000	30.000	15.8	17.7	01/16/2005
2	1	160.32000	FB	1	0	20K0F3E	20.000	30.000	15.8	17.7	01/16/2005
2	1	160.78500	FB	1	0	20K0F3E	20.000	30.000	15.8	17.7	01/16/2005

3	1	160.23000	FB	1	0	20K0F3E	20.000	30.000	15.8	13.8	01/16/2005
3	1	160.29000	FB	1	0	20K0F3E	20.000	30.000	15.8	13.8	01/16/2005
3	1	160.32000	FB	1	0	20K0F3E	20.000	30.000	15.8	13.8	01/16/2005
3	1	160.78500	FB	1	0	20K0F3E	20.000	30.000	15.8	13.8	01/16/2005
4	1	160.23000	FB	1	0	20K0F3E	20.000	30.000	15.8	10.5	01/16/2005
4	1	160.29000	FB	1	0	20K0F3E	20.000	30.000	15.8	10.5	01/16/2005
4	1	160.32000	FB	1	0	20K0F3E	20.000	30.000	15.8	10.5	01/16/2005
4	1	160.78500	FB	1	0	20K0F3E	20.000	30.000	15.8	10.5	01/16/2005
5	1	160.23000	FB	1	0	20K0F3E	20.000	30.000	15.8	8.5	01/16/2005
5	1	160.29000	FB	1	0	20K0F3E	20.000	30.000	15.8	8.5	01/16/2005
5	1	160.32000	FB	1	0	20K0F3E	20.000	30.000	15.8	8.5	01/16/2005
5	1	160.78500	FB	1	0	20K0F3E	20.000	30.000	15.8	8.5	01/16/2005

Control Points **Pt. No.1**

Address: 3019 WARRINGTON STREET

City: JACKSONVILLE **County:** DUVAL **State:** FL **Telephone Number:** (904)388-2180

Licensee: Soo System Radio Communications Corporation

FCC Registration Number (FRN):
0002606689

Call Sign: WPYE856 **File Number:**

ATTN James C Thomas
Soo System Radio Communications Corporation
501 Marquette
Minneapolis, MN 55402

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
07/29/2003	07/29/2003	07/29/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: Bensenville Communications Tower
City: Bensenville **County:** COOK **State:** IL
Lat (NAD83): 41-57-01.1 N **Long (NAD83):** 087-54-49.2 W **ASR No.:** 1232256 **Ground Elev:** 199.0

Loc. 2 Address: Tower B17
City: Bensenville **County:** COOK **State:** IL
Lat (NAD83): 41-57-23.3 N **Long (NAD83):** 087-56-13.6 W **ASR No.:** 1234468 **Ground Elev:** 205.4

Loc. 3 Area of Operation
Operating within a 40.0 km radius around fixed location 2

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.77000	FB	1	0	20K0F3E	40.000	110.000	16.0	13.8	07/29/2004
1	1	161.08500	FB	1	0	20K0F3E	40.000	110.000	16.0	13.8	07/29/2004
1	1	161.52000	FB	1	0	20K0F3E	40.000	110.000	16.0	13.8	07/29/2004
1	2	160.77000	FB	1	0	20K0F3E	40.000	110.000	16.0	13.8	07/29/2004
1	2	161.08500	FB	1	0	20K0F3E	40.000	110.000	16.0	13.8	07/29/2004
1	2	161.52000	FB	1	0	20K0F3E	40.000	110.000	16.0	13.8	07/29/2004
2	1	160.48500	FB	1	0	20K0F3E	40.000	110.000	20.1	19.1	07/29/2004
2	1	160.62000	FB	1	0	20K0F3E	40.000	110.000	20.1	19.1	07/29/2004
2	1	160.77000	FB	1	0	20K0F3E	40.000	110.000	20.1	19.1	07/29/2004
2	1	161.08500	FB	1	0	20K0F3E	40.000	110.000	20.1	19.1	07/29/2004
2	1	161.43000	FB	1	0	20K0F3E	40.000	110.000	20.1	19.1	07/29/2004
2	1	161.52000	FB	1	0	20K0F3E	40.000	110.000	20.1	19.1	07/29/2004
3	1	160.48500	MO	40	0	20K0F3E	40.000	40.000			07/29/2004
3	1	160.62000	MO	40	0	20K0F3E	40.000	40.000			07/29/2004
3	1	160.77000	MO	40	0	20K0F3E	40.000	40.000			07/29/2004
3	1	161.08500	MO	40	0	20K0F3E	40.000	40.000			07/29/2004

3	1	161.37000	MO	40	0	20K0F3E	40.000	40.000	07/29/2004
3	1	161.43000	MO	40	0	20K0F3E	40.000	40.000	07/29/2004
3	1	161.52000	MO	40	0	20K0F3E	40.000	40.000	07/29/2004

Control Points **Pt. No.**1

Address: 501 Marquette Ave

City: Minneapolis **County:** HENNEPIN **State:** MN **Telephone Number:** (612)347-8191

Pt. No.2

Address: Tower B17

City: Bensenville **County:** COOK **State:** IL **Telephone Number:** (612)347-8191

Licensee: The Burlington Northern and Santa Fe Railway Company

FCC Registration Number (FRN):
0004772877

Call Sign: WNPO573 **File Number:**

ATTN ROBERT LEEDHAM
The Burlington Northern and Santa Fe Railway Company
4515 KANSAS AVE
KANSAS CITY, KS 66106

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
08/06/1999	07/24/2001	09/27/2004	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** ALONG THE SANTA FE RIGHT OF WAY 2.5 MI NNE
City: VALENTINE **County:** MOHAVE **State:** AZ
Lat (NAD83): 35-25-20.0 N **Long (NAD83):** 113-38-44.8 W **ASR No.:** **Ground Elev:** 1246.0

Loc. 2 **Address:** ALONG THE SANTA FE RIGHT OF WAY 3.4 MI WNW
City: ELWOOD **County:** WILL **State:** IL
Lat (NAD83): 41-25-06.1 N **Long (NAD83):** 088-10-18.2 W **ASR No.:** **Ground Elev:** 163.0

Loc. 3 **Address:** SANTA FE RIGHT OF WAY 1.9 MI SW
City: CAMERON **County:** WARREN **State:** IL
Lat (NAD83): 40-52-39.1 N **Long (NAD83):** 090-33-15.5 W **ASR No.:** **Ground Elev:** 238.0

Loc. 4 **Address:** ALONG THE SANTA FE RIGHT OF WAY 1.7 MI E
City: STREATOR **County:** LA SALLE **State:** IL
Lat (NAD83): 41-08-14.1 N **Long (NAD83):** 088-46-32.3 W **ASR No.:** **Ground Elev:** 200.0

Loc. 5 **Address:** ALONG THE SANTA FE RIGHT OF WAY 2.2 MI ENE
City: SAFFORDVILLE **County:** LYON **State:** KS
Lat (NAD83): 38-24-20.0 N **Long (NAD83):** 096-21-06.0 W **ASR No.:** **Ground Elev:** 348.0

Loc. 6 **Address:** ALONG THE SANTA FE RIGHT OF WAY 2.2 MI NE
City: LEMONT **County:** DU PAGE **State:** IL
Lat (NAD83): 41-41-41.1 N **Long (NAD83):** 087-58-14.2 W **ASR No.:** **Ground Elev:** 183.0

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.93500	FB	1	0	20K0F3E	20.000	2.000	5.0	0.0	
2	1	160.65000	FB	1	0	20K0F3E	20.000	2.000	5.0	0.0	
3	1	160.65000	FB	1	0	20K0F3E	20.000	2.000	5.0	0.0	
4	1	160.65000	FB	1	0	20K0F3E	20.000	2.000	5.0	0.0	
5	1	160.65000	FB	1	0	20K0F3E	20.000	2.000	5.0	0.0	

6	1	160.65000	FB	1	0	20K0F3E	20.000	2.000	5.0	0.0

Control Points **Pt. No.**1

Address: ALONG THE SANTA FE RIGHT OF WAY 2.5 MI NNE

City: VALENTINE **County:** **State:** AZ **Telephone Number:**

Licensee: Northeast Illinois Regional Commuter Railroad Corporation

FCC Registration Number (FRN): 0002849818

Call Sign: WPWX313

File Number:

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

ATTN Communications Engineer
Northeast Illinois Regional Commuter Railroad Corporation
547 W Jackson Blvd
Chicago, IL 66106

Grant Date	Effective Date	Expiration Date	Print Date
02/03/2003	02/03/2003	02/03/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 2801 W Grand
City: Chicago **County:** COOK **State:** IL
Lat (NAD83): 41-53-35.1 N **Long (NAD83):** 087-41-46.2 W **ASR No.:** **Ground Elev:** 181.0

Loc. 2 **Address:** Elgin Depot 109 W Lake St.
City: Elgin **County:** KANE **State:** IL
Lat (NAD83): 42-02-13.1 N **Long (NAD83):** 088-16-56.3 W **ASR No.:** **Ground Elev:** 219.0

Loc. 3 **Address:** Fox Lake Nippersink Grand
City: Fox Lake **County:** LAKE **State:** IL
Lat (NAD83): 42-23-53.1 N **Long (NAD83):** 088-10-56.3 W **ASR No.:** **Ground Elev:** 229.0

Loc. 4 **Address:** Wooddale Station Irving Park Rd & Oak St.
City: Wooddale **County:** DU PAGE **State:** IL
Lat (NAD83): 41-57-42.1 N **Long (NAD83):** 087-58-31.2 W **ASR No.:** **Ground Elev:** 217.0

Loc. 5 **Address:** 860 Deerfield Rd.
City: Deerfield **County:** LAKE **State:** IL
Lat (NAD83): 42-10-03.1 N **Long (NAD83):** 087-51-00.2 W **ASR No.:** **Ground Elev:** 205.0

Loc. 6 **Area of Operation**
Operating within a 40.0 km radius around fixed location 1

Loc. 7 **Area of Operation**
Operating within a 40.0 km radius around fixed location 2

Loc. 8 **Area of Operation**
Operating within a 40.0 km radius around fixed location 3

Loc. 9 **Area of Operation**
Operating within a 40.0 km radius around fixed location 1

Loc. 10 **Area of Operation**
Operating within a 40.0 km radius around fixed location 2

Loc. 11 **Area of Operation**
Operating within a 40.0 km radius around fixed location 3

Antennas

Loc Ant Frequencies Sta No No Emmission Output ERP Ant Ant Construct

No.	No.	(MHz)	Cls.	Units	Pagers	Designator	Power (watts)	(watts)	Ht./Tp meters	AAT meters	Deadline Date
1	1	160.60500	FB	1	0	20K0F3E	75.000	200.000	27.0	26.2	02/03/2004
2	1	160.60500	FB	1	0	20K0F3E	40.000	75.000	15.0	-12.8	02/03/2004
3	1	160.60500	FB	1	0	20K0F3E	40.000	75.000	15.0	4.3	02/03/2004
4	1	160.60500	FB	1	0	20K0F3E	40.000	75.000	15.0	21.3	02/03/2004
5	1	160.60500	FB	1	0	20K0F3E	40.000	75.000	15.0	21.6	02/03/2004
6	1	160.60500	MO	40	0	20K0F3E	40.000	40.000			02/03/2004
7	1	160.60500	MO	40	0	20K0F3E	40.000	40.000			02/03/2004
8	1	160.60500	MO	40	0	20K0F3E	40.000	40.000			02/03/2004
9	1	160.60500	MO	40	0	20K0F3E	5.000	5.000			02/03/2004
10	1	160.60500	MO	40	0	20K0F3E	5.000	5.000			02/03/2004
11	1	160.60500	MO	40	0	20K0F3E	5.000	5.000			02/03/2004

Control Points **Pt. No.**1

Address: 2801 W Grand Ave.

City: Chicago **County:** COOK **State:** IL **Telephone Number:** (312)322-2831

Associated Call Signs
WNIY497, WNJS224

Licensee: NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD CORP

FCC Registration Number (FRN): 0002849818

Call Sign: WPWY559 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

ATTN BRUCE MARCHESCHI
NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD CORP
547 W JACKSON BLVD
CHICAGO, IL 60661-5717

Grant Date	Effective Date	Expiration Date	Print Date
02/10/2003	05/06/2003	02/10/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 151 E RANDOLPH ST
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-53-05.1 N **Long (NAD83):** 087-37-26.2 W **ASR No.:** **Ground Elev:** 175.0

Loc. 2 Address: 23RD STREET STATION ON METRA ELECTRIC
City: CHICAGO **County:** COOK **State:** IL
Lat (NAD83): 41-51-07.2 N **Long (NAD83):** 087-37-00.3 W **ASR No.:** **Ground Elev:** 1814.0

Loc. 3 Area of Operation
Operating within a 40.0 km radius around fixed location 2

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.02500	FB	1	0	16K0F3E	35.000	35.000	6.0	0.6	02/10/2004
2	1	161.02500	FB	1	0	16K0F3E	35.000	35.000	5.5	6.4	02/10/2004
3	1	161.02500	MO	250	0	16K0F3D 16K0F3E	40.000	40.000			02/10/2004
3	1	161.02500	MO	70	0	16K0F3D 16K0F3E	5.000	5.000			02/10/2004

Control Points Pt. No.1

Address: 151 E RANDOLPH ST
City: CHICAGO **County:** COOK **State:** IL **Telephone Number:** (312)322-2465

Associated Call Signs
WNMV660, WNUI971, WNMV659

Licensee: The Burlington Northern and Santa Fe Railway Company

FCC Registration Number (FRN): 0004772877

Call Sign: WPYE978 **File Number:**

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

ATTN Robert Leedham
The Burlington Northern and Santa Fe Railway Company
4515 Kansas Avenue
Kansas City, KS 66106

Grant Date	Effective Date	Expiration Date	Print Date
07/29/2003	07/29/2003	07/29/2013	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: 7600 Sante Fe Drive Panel Hut

City: Hodgkins **County:** COOK **State:** IL

Lat (NAD83): 41-47-31.1 N **Long (NAD83):** 087-47-33.2 W **ASR No.:** **Ground Elev:** 191.7

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.65000	FB	1	0	20K0F1D 20K0F3E	5.000	5.000	3.7	-2.6	07/29/2004
1	1	160.99500	FB	1	0	20K0F1D 20K0F3E	5.000	5.000	3.7	-2.6	07/29/2004

Control Points Pt. No.1

Address: 4515 Kansas Ave

City: Kansas City **County:** WYANDOTTE **State:** KS **Telephone Number:** (913)551-4615

Associated Call Signs
KA2687

Licensee: Wiconsin Central System

FCC Registration Number (FRN): 0005263579

Call Sign: WQAG471 **File Number:**

ATTN Michael O'Connell
Wiconsin Central System
17641 S Ashland Ave
Homewood, IL 60430

Radio Service: IG - Industrial/Business Pool, Conventional

Regulatory Status: PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
05/26/2004	05/26/2004	05/26/2014	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** 780 Central Road
City: Desplaines **County:** COOK **State:** IL
Lat (NAD83): 42-03-57.7 N **Long (NAD83):** 087-54-02.6 W **ASR No.:** **Ground Elev:** 200.0

Loc. 2 **Address:** 234151 Main St
City: Prairie View **County:** LAKE **State:** IL
Lat (NAD83): 42-12-13.0 N **Long (NAD83):** 087-57-31.8 W **ASR No.:** **Ground Elev:** 212.0

Loc. 3 **Address:** 32326 N HWY 83
City: Grayslake **County:** LAKE **State:** IL
Lat (NAD83): 42-20-01.4 N **Long (NAD83):** 088-01-46.4 W **ASR No.:** **Ground Elev:** 247.0

Loc. 4 **Address:** 23437 W Grimm Rd
City: Antioch **County:** LAKE **State:** IL
Lat (NAD83): 42-27-51.8 N **Long (NAD83):** 088-05-25.9 W **ASR No.:** **Ground Elev:** 241.0

Loc. 5 **Area of Operation**
Operating within a 32.0 km radius around fixed location 1

Loc. 6 **Area of Operation**
Operating within a 32.0 km radius around fixed location 2

Loc. 7 **Area of Operation**
Operating within a 32.0 km radius around fixed location 3

Loc. 8 **Area of Operation**
Operating within a 32.0 km radius around fixed location 4

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	161.29500	FB	1	0	20K0F3E	45.000	90.000	4.5	-0.7	05/26/2005
2	1	161.29500	FB	1	0	20K0F3E	45.000	90.000	4.5	-2.3	05/26/2005
3	1	161.29500	FB	1	0	20K0F3E	45.000	90.000	4.5	19.6	05/26/2005
4	1	161.29500	FB	1	0	20K0F3E	45.000	90.000	4.5	8.2	05/26/2005
5	1	161.29500	MO	5	0	20K0F3E	45.000	90.000			05/26/2005

6	1	161.29500	MO	5	0	20K0F3E	45.000	90.000	05/26/2005
7	1	161.29500	MO	5	0	20K0F3E	45.000	90.000	05/26/2005
8	1	161.29500	MO	5	0	20K0F3E	45.000	90.000	05/26/2005

Control Points **Pt. No.**1

Address: 780 Central Rd

City: Desplaines **County:** COOK **State:** IL **Telephone Number:** (715)345-2461

Pt. No.2

Address: 23451 Main St

City: Prairie View **County:** LAKE **State:** IL **Telephone Number:** (715)345-2461

Pt. No.3

Address: 32326 N HWY 83

City: Grays Lake **County:** LAKE **State:** IL **Telephone Number:** (715)345-2461

Pt. No.4

Address: 23437 W Grimm Rd

City: Antioch **County:** LAKE **State:** IL **Telephone Number:** (715)345-2461

Licensee: The Burlington Northern and Santa Fe Railway Company

FCC Registration Number (FRN):
0004772877

Call Sign: WQL816 **File Number:**

ATTN Robert Leedham
The Burlington Northern and Santa Fe Railway Company
4515 KANSAS AVE
KANSAS CITY, KS 66106

Radio Service:
IG - Industrial/Business Pool, Conventional

Regulatory Status:
PMRS

Frequency Coordination Number:

Grant Date	Effective Date	Expiration Date	Print Date
12/09/2003	12/09/2003	01/13/2014	07/07/2004

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Address:** JCT OAKWOOD & WARREN ST

City: DOWNERS GROVE **County:** DU PAGE **State:** IL

Lat (NAD83): 41-47-45.1 N **Long (NAD83):** 088-01-06.2 W **ASR No.:** **Ground Elev:** 216.0

Loc. 2 **Area of Operation**
Operating within a 80.0 km radius around fixed location 1

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emmission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	160.42500	FB2	1	0	20K0F3E	45.000	80.000	57.0	0.0	
2	1	160.93500	MO	35	0	20K0F3E	30.000				

Control Points **Pt. No.**1

Address: JCT OAKWOOD & WARREN ST

City: DOWNERS GROVE **County:** **State:** IL **Telephone Number:**

PSP TROOP ASSIGNMENTS (NEPA & CENTRAL):

TROOP F
(F1)-Montoursville (Headquarters) (Lycoming Co.)
(F5)-Mansfield (Tioga Co.)
(F6)-Milton (Union Co.)
(F7)-Selinsgrove (Snyder Co.)
(F8)-Stoneington (Northumberland Co.)

TROOP L
(L3)-Frackville (Schuylkill Co.)
(L7)-Schuylkill Haven (Schuylkill Co.)

TROOP N
(N1)-Hazleton (Headquarters)(Luzerne Co.)
(N2)-Bloomsburg (Columbia Co.)
(N3)-Fern Ridge (Monroe Co.)
(N4)-Leighton (Carbon Co.)
(N6)-Swiftwater (Monroe Co.)

TROOP P
(P1)-Wyoming (Headquarters) (Luzerne Co.)
(P2)-Dushore (Sullivan Co.)
(P4)-Shickshinny (Luzerne Co.)
(P5)-Towanda (Bradford Co.)
P6)-Tunkhann(ock (Wyoming Co.)

TROOP R
(R1)-Dunmore (Headquarters) (Lackawanna Co.)
(R3)-Honesdale (Wayne Co.)
(R4)-Blooming Grove (Pike Co.)
(R5)-Gibson (Susquehanna Co.)

(F1)--154.7550-Mobile to Mobile
(F2)--155.5800-Base/154.9500-Mobile
(F3)--155.6700-Base/156.9100-Mobile
(F4)--155.5050-Base/155.5800-Mobile
(F5)--154.6650-Base/158.9100-Mobile
(F6)--154.6950-Base/156.1500-Mobile
(F7)--154.9200-Base/154.8300-Mobile
(F8)--155.4450-Base/155.4450-Mobile
(F9)--155.4750-National Police Band
(F11)--154.7550-Mobile to Portable/159.2100-Mobile to Portable
(F12)--155.4600-Tac 1
(F13)--151.4900-Tac 2
(F23)--159.0450-PA Turnpike North & South
(F24)--159.0750-PA Turnpike East & West
(F25)--159.0000-PA Turnpike Mobile to Moblie
155.7900-Tac 3
156.1500-Tac East
154.9050-Tac West
159.0300-???
46.2000-Base to Base
155.4900-PA Regional Clean
453.0750/458.0750-PSP Portables
866.5125-PSP Nationwide Intersystem
867.0125-PSP Nationwide Intersystem
868.0125-PSP Nationwide Intersystem

Bradford County PSP 800mhz
867.8875--868.2375--868.6375--868.8625

Carbon County PSP 800mhz
866.6000--866.8500--867.3500--867.5625
867.5875--867.7875--867.8500--868.1000--868.2875

Columbia County PSP 800mhz
866.7875--867.3250--867.8250--868.3500--868.8000

Lackawanna County PSP 800mhz
866.0625--866.8125--867.0625--867.0875--868.0625
868.3125--868.5500--868.5875--868.8125--868.8375

Luzerne County PSP 800mhz
866.1125--866.3875--866.6375--866.8875--867.1375
867.3875--867.6125--867.6375--867.8875--868.6125

Monroe County PSP 800mhz
866.2875--867.2875--868.1250--868.3375--868.3625

Schuylkill County PSP 800mhz
867.4250--868.1750--868.4375--868.6750--868.9250

Sullivan County PSP 800mhz
866.8250--868.0750--868.3250--868.5750

Susquehanna County PSP 800mhz
866.0875--866.5625--867.3250--867.5625--867.8250

Wanyne County PSP 800mhz
866.8375--866.8625--867.3625--868.1500--868.8875

Wyoming County PSP 800mhz
866.3125--866.3500--866.6125--867.8625

601-Driving without valid license
2501-Homicide
2502-Murder
2606-Terrorist Threats
2701-Assault
2702-Aggravated Assault
2705-Reckless Endangerment
2709-Harassment
2901-Kidnapping
3121-Rape
3122-Statutory Rape
3125-Corrupting a minor
3126-Indecent Assault
3127-Indecent Exposure
3301-Arson
3304-Criminal Mischief
3306-Opening Fire Hydrants
3502-Burglary
3503-Criminal Trespassing
3701-Robbery
3714-Reckless Driving
3731-DUI or DWI
3732-Vehicular Homicide
3925-Receiving Stolen Property
3926-Theft of Services
4101-Forgery
4105-Bad Checks
4106-Forged Credit Cards
4304-Endangering Welfare of Children
4905-Filing False Police Report
5104-Resisting Arrest
5121-Escape from Custody
5501-Riot
5503-Disorderly Conduct
5504-Harassing Phone Calls
5505-Public Drunkenness
5506-Loitering or Prowling
5513-Illegal Gambling
5902-Prostitution
6308-Drinking by a minor

CAP (Combat Air Patrol) Frequencies over Select US Cities

As events of 9/11/01 began to unfold the US Military started flying Air Cover missions over various cities including New York, Washington DC, and Central Florida (due to the Kennedy Space Center). Some people think these frequencies should not be published. However this is how I look at it. The military is not full of dumb or stupid people (the Clinton days are over). The military very well knows that there are many many hobbiest out there monitoring every word they say on the UHF MilAir Bands (and VHF Civial Air Bands). The military has some of the most advanced communications equipment in the world, if they have anything to say that we are not to hear, believe me, we wouldn't hear it! And yes while monitoring CAP flights over KSC I've heard a few digitally scrambled transmissions, however rare does it happen. Nearly 99% of the CAP transmissions have been "in the clear".

NOTE: Always have 121.5000 MHz programmed into your scanner. This is the Air Emergency frequency. It is this freq that you will hear CAP aircraft give warnings to Civil aircraft about airspace violations. I've heard on this freq several times "change course now or you WILL be fired upon!". Hearing those words can send chills up your back.

CAP Frequencies - New York City area

Updated 6/24/03

Frequency	Description	Modulation
271.0000	COSMIC ## (confirmed 6/23)	AM
138.4250	Air-Air (used on 6/23)	AM
143.9250	Air-Air	AM

CAP Frequencies - Florida

Frequency	Description	Modulation
234.8000	Air-Air & to OAKGROVE (NORAD)	AM
265.4000	Air-Air & to OAKGROVE (NORAD) (BLUE 14)	AM
300.1250	Air-Air & to OAKGROVE (NORAD)	AM
305.4000	Air-Air (16 AUX)	AM
307.2500	Air-Air & to OAKGROVE (NORAD)	AM
338.7500	Air-Air	AM
252.0000	CAP Flights calling Refueler (RUBBER ##), also comms to OAKGROVE	AM
269.2500	JAX Center (If CAP's center over Orlando CAP works JAX Center on this freq.)	AM
273.5500	JAX Center (If CAP's center over Orlando CAP works JAX Center on this freq.)	AM

346.2000	JAX Center (If CAP's center over Orlando CAP works JAX Center on this freq.)	AM
269.3000	Miami Center (If CAP's center over Kennedy Space Center CAP works Miami Center on this freq.)	AM
CREEPY ## = F16's out of Tyndall CASINO ## = F15's, CLAW ## = F16's, WAM ## = not sure type but its believed they are out of Tyndall, maybe F16's, RUBBER ## and TANKER ## - Refueling support for CAP		

CAP Frequencies - Washington, DC Area

Updated 5/17/03

Frequency	Description	Modulation
120.3750	(1) Langley AFB 'Jaws' Push	AM
123.0250	Pentagon VIP Transport	AM
138.4250	Air - Air	AM
139.1500	(1) Air-Air	AM
139.9000	Air - Air	AM
141.8500	Air - Air	AM
142.3000	(1) Air - Air	AM
143.8000	Hill AFB F-16's - Langley (updated 3/12/03)	AM
228.9000	Huntress (NORAD)	AM
234.6000	Huntress (NORAD)	AM
225.0000	NORAD (updated 3/12/03)	AM
255.8000	Huntress (NORAD)	AM
271.0000	Huntress (NORAD)	AM
282.4250	US Customs - Flies low cover; CAP handles high altitudes (updated 3/12/03)	AM
303.0000	Mid-Air CAP Refueling	AM
307.2500	CAP Control	AM
320.6000	Refueling Boom Freq (updated 3/12/03)	AM
324.0000	CAP Corrdination (updated 3/12/03)	AM
357.1000	(1) Langley AFB 'Jaws" ops	AM
360.7000	Washington Center	AM
362.3000	AWAC/F-16's (Gator)	AM
364.2000	E-3 AWACS	AM
370.1000	(1) TACAMO Aircraft	AM

(1) = Supplied by Mike - ka3jjz@erols.com 5/17/03

CAP Frequencies - Philadelphia, PA area

Frequency	Description	Modulation
362.3000	Devil 41	AM

CAP Frequencies - Washington State Area

Frequency	Description	Modulation
271.0000	BLUE 15 BigFoot - Refueling	AM
275.8000	BigFoot (Air-Air)	AM
364.2000	BLUE 07	AM
252.0000	BLUE 11	AM
282.6000	BLUE 17	AM
288.4000	BLUE 19	AM
300.1250	BLUE 40	AM
321.3000	AMBER 6	AM

CAP Frequencies - Chicago, IL Area

Frequency	Description	Modulation
364.8000	Very Active	AM

CAP Frequencies - Nevada/Arizona Area

Frequency	Description	Modulation
138.675	VHF Freq	AM
252.0000	BigFoot	AM
271.0000	BigFoot	AM
321.3000	BigFoot (Air-Air)	AM

Blue Angels Frequencies
Updated March 23, 2006

Frequency	Modulation	Description
143.6000	AM	A-A & GND Support
237.8000	AM	A-A X-C Blue Angels
238.1500	AM	A-A X-C Blue Angels
237.8000	AM	Startup Blue Angels
273.3000	AM	Startup Blue Angels
275.3500	AM	Startup Blue Angels
284.2500	AM	Startup Blue Angels
173.8250	FM	Comm Cart
143.0000	FM	ATC Observer
238.1500	AM	Diamond Blue Angels
263.3500	AM	Diamond Blue Angels
264.3500	AM	Diamond Blue Angels
264.5500	AM	Diamond Blue Angels
265.0000	AM	Diamond Blue Angels
275.3500	AM	Diamond Blue Angels
284.2500	AM	Diamond Blue Angels
299.6500	AM	Diamond Blue Angels
307.7000	AM	Diamond Blue Angels
237.8000	AM	Solos Blue Angels
249.6250	AM	Solos Blue Angels
251.6000	AM	Solos Blue Angels
345.9000	AM	Solos Blue Angels
346.5000	AM	Solos Blue Angels
237.8000	AM	Delta Blue Angels
275.3500	AM	Delta Blue Angels
236.4500	AM	Fat Albert Blue Angels
263.3500	AM	Fat Albert Blue Angels
263.5000	AM	Fat Albert Blue Angels
273.3000	AM	Fat Albert Blue Angels
305.5000	AM	Fat Albert Blue Angels
254.5000	AM	Unk Blue Angels
262.8500	AM	Unk Blue Angels
381.0000	AM	Unk Blue Angels
255.2000	AM	Unk Blue Angels
302.1000	AM	Unk Blue Angels

US Airforce Thunderbird Frequencies

Below are the frequencies used by the US Airforce Thunderbirds. Please take note that US Military frequencies in the 138-144 MHz range are in AM mode. Most scanners will default to FM if programming a frequencies of this range, you'll need to change the mode in order to hear comms on these frequencies.

Thunderbird Frequencies

Updated 06/08/2003

Frequency	Description	Modulation
140.2000	Support Aircraft X-Country Air-Air	AM
141.4000	4 Plane Formation	AM
141.8500	4 Plane Formation link to PA	AM
143.8500 *(1), (2)*	4 Plane Formation link to PA and Air-Air	AM
235.2500	Thunderbird Control	AM
269.9000 *(1), (3)*	Thunderbird Control to AirBoss	AM
322.9500 *(1)*	Plane 5-6 Solo Air-Air	AM
413.0250 *(1)*	Maintenance/Ground Channel 1	FM
413.1000	Maintenance/Ground Channel 2	FM

(1) = Confirmed in November 2001 during Daytona Beach, FL Airshow.
(2) = Confirmed in May 2003 during Patrick AFB Airshow.
(3) = This frequency is also a Jacksonville Center freq. The T-Birds still used it for their show.

	Licensee that is a survey organisation	2,140 4,615	Operation of the aircraft non assigned station must only employ SSB modulation using USB with a necessary bandwidth not exceeding 2.8 kHz
2	Any licensee	3,216 3,704 3,876 6,628 6,697	Operation of the aircraft non assigned station must only employ SSB modulation using USB with a necessary bandwidth not exceeding 2.8 kHz

PART 2 - OPERATION ON VERY HIGH FREQUENCY

Column 1 Item No.	Column 2 Permitted organisations/aircraft and purpose of communication	Column 3 Carrier frequency (MHz)	Column 4 Technical restrictions
1	a. Licensee that is an aero club b. Licensee that is a flying school c. Licensee in relation to an aircraft non assigned station used solely for the purpose of firespotting	119.1	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6kHz
2	Licensee that is a parachute club, or a member of a parachute club	119.2	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6kHz
3	License in relation to an aircraft non assigned station used: a. for a helicopter; and b. for air to air communications only	120.4	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6kHz
4	Licensee in relation to an aircraft non assigned station used: a. for a helicopter; and b. for ground to air communications only	120.8	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6 kHz
5	Licensee in relation to an aircraft non assigned station used only for the purpose of aviation sport	120.85	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6 kHz
6	Licensee in relation to an aircraft non assigned station that is: a. an emergency location beacon; or b. an emergency position indicating radio beacon; used only for sending distress signals	121.5 243.0	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6 kHz
7	Licensee in relation to an aircraft non assigned station used for a glider or sailplane	122.5 122.7 122.9	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6

			kHz
8	a. Licensee that is an agricultural or fishing organisation only b. Licensee in relation to an aircraft non assigned station used solely for the purpose of cattle mustering	122.8	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6 kHz
9	Licensee in relation to an aircraft non assigned station used for air to air communications below Flight Level 200	126.35	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6 kHz
10	a. Licensee in relation to an aircraft non assigned station using common traffic advisory frequencies or mandatory traffic advisory frequencies b. Licensee in relation to an aircraft non assigned station using UNICOM services only	126.7	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6 kHz
11	Licensee in relation to an aircraft non assigned station used for air to air communications at Flight Level 200 and above	128.95	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6 kHz
12	Licensee in relation to an aircraft non assigned station used solely for the purpose of aircraft industry testing	129.1	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6 kHz
13	a. Licensee that is an agricultural organisation b. Licensee in relation to an aircraft non assigned station used solely for the purpose of crop dusting	129.6	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6 kHz
14	Licensee that is an aerodrome operator	129.9	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6 kHz
15	Licensee that is a high level charter organisation	135.95	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6 kHz
16	a. Licensee not listed in another item b. Licensee that is a charter organisation	126.4 128.9 135.55	Operation of the aircraft non assigned station must only employ AM with a necessary bandwidth not exceeding 6 kHz

(c) operates the station on any of the following frequencies for the purposes of search and rescue only:

(i) 2,182 kHz;

(ii) 3,023 kHz;

(iii) 4,125 kHz;

(iv) 5,680 kHz;

(v) 121.5 MHz;

(vi) 123.1 MHz;

(vii) 156.3 MHz;

(viii) 156.8 MHz.

Frequency	Use
122.700	Airports without an operating control tower
122.725	Airports without an operating control tower
122.750	Air-to-air communications & private airports (not open to the public)
122.800	Airports without an operating control tower
122.900	(MULTICOM FREQUENCY) Activities of a temporary, seasonal, or emergency nature.
122.925	(MULTICOM FREQUENCY) Forestry management and fire suppression, fish and game management and protection, and environmental monitoring and protection.
122.950	Airports with control tower or FSS on airport
122.975	Airports without an operating control tower
123.000	Airports without an operating control tower
123.050	Airports without an operating control tower
123.075	Airports without an operating control tower

	Receive Frequency	Receive Mode	Channel Name	Preferential Scan
0	59.75000	WFM	C02aWBBM	☐
1	71.75000	WFM	N04aWTMJ	☐
2	81.75000	WFM	N05aWMAQ	☐
3	87.75000	WFM	F06aWITI	☐
4	179.75000	WFM	A07aWLS	☐
5	185.75000	WFM	R08aWQFL	☐
6	191.75000	WFM	U09aWGN	☐
7	197.75000	WFM	P10aWMVS	☐
8	203.75000	WFM	P11aWTTW	☐
9	209.75000	WFM	I12aWISN	☐
10	215.75000	WFM	N13aWREX	☐
11	475.75000	WFM	W14aWIWB	☐
12	499.75000	WFM	H18aWVTV	☐
13	511.75000	WFM	E20aWYCC	☐
14	529.75000	WFM	G23aWFBT	☐
15	535.75000	WFM	U24aWCGV	☐
16	547.75000	WFM	I26aWCIU	☐
17	571.75000	WFM	R30aWVCY	☐
18	583.75000	WFM	F32aWFLD	☐
19	595.75000	WFM	R34aWJYS	☐
20	607.75000	WFM	P36aWMVT	☐
21	619.75000	WFM	P38aWCPX	☐
22	631.75000	WFM	P40aWPXE	☐
23	655.75000	WFM	S44aWSNS	☐
24	691.75000	WFM	W50aWPWR	☐
25	721.75000	WFM	P55aWPXE	☐
26	727.75000	WFM	P56aWYIN	☐
27	733.75000	WFM	T57W57DN	☐
28	739.75000	WFM	C58aWDJT	☐
29	751.75000	WFM	S60aWEHS	☐
30	763.75000	WFM	I62aWTYS	☐
31	775.75000	WFM	T64W64CQ	☐
32	799.75000	WFM	T68W36AO	☐
33	226.30000	AM	MDWtower	☑
34	226.40000	AM	LANapp	☑
35	237.90000	AM	UCG S&R	☑
36	239.00000	AM		☑
37	239.80000	AM	UFA Wx	☑
38	240.90000	AM	LANtwr??	☑
39	241.00000	AM	UAR	☑
40	242.40000	AM	?????	☑
41	243.00000	AM	ORD emer	☑
42	252.10000	AM	ORD ALCP	☑
43	255.40000	AM	UFAflsvc	☑
44	257.80000	AM	CGXtower	☑
45	269.50000	AM	Chi dep	☑
46	269.90000	AM	ORD ATIS	☑
47	284.00000	AM	Chi appr	☑
48	287.30000	AM	2	☑
49	287.80000	AM	UCGrescu	☑
50	288.15000	AM		☑
51	290.20000	AM	ORD CLB	☑
52	307.20000	AM	Chi dep	☑
53	311.00000	AM	UAF ACC	☑
54	318.00000	AM	UAFACC06	☑
55	319.00000	AM	UFA atc	☑
56	321.00000	AM	UAFACC11	☑
57	324.20000	AM	UAFACC14	☑
58	324.50000	AM	UAFACC12	☑
59	335.80000	AM	UAFACC17	☑
60	336.60000	AM	UAFACC18	☑
61	337.40000	NFM	Chi dep	☑
62	339.80000	AM		☑
63	342.50000	AM	UFA Wx	☑
64	344.60000	AM	UFA Wx	☑
65	346.40000	AM	UAFACC04	☑
66	348.60000	NFM	ORD gnd	☑
67	349.00000	AM	UAFACC13	☑
68	349.40000	AM	UAFtower	☑
69	353.60000	AM		☑
70	359.30000	AM	UAFACC03	☑
71	363.80000	AM	UFA atc	☑
72	364.20000	AM	UAFNORAD	☑
73	371.90000	AM		☑
74	380.15000	AM		☑
75	381.80000	AM	UCG	☑
76	383.90000	AM	UCG	☑
77	384.90000	AM	2	☑
78	390.00000	AM		☑
79	390.90000	AM	ORDtower	☑
80	393.10000	AM	Chi appr	☑
81				☐
82				☐
83				☐
84				☐
85				☐
86				☐
87				☐
88				☐
89				☐
90				☐
91				☐
92				☐
93				☐
94				☐
95				☐
96				☐
97				☐
98				☐
99				☐

51	290.2	AM	OAD CLB	Preferential
52	307.2	AM	Chi dep	Preferential
53	311	AM	UAF ACC	Preferential
54	318	AM	UAFACC0	Preferential
55	319	AM	UFA etc	Preferential
56	321	AM	UAFACC1	Preferential
57	324.2	AM	UAFACC1	Preferential
58	328.8	AM	UAFACC1	Preferential
59	335.8	AM	UAFACC1	Preferential
60	338.2	AM	UAFACC1	Preferential
61	337.4	NFM	Chi dep	Preferential
62	339.8	AM	u	Preferential
63	340.5	AM	UFA Wx	Preferential
64	344.6	AM	UFA Wx	Preferential
65	346.4	AM	UAFACC0	Preferential
66	348.6	NFM	OAD gnd	Preferential
67	348	AM	UAFACC1	Preferential
68	349.4	AM	UAFtower	Preferential
69	353.8	AM	u	Preferential
70	359.3	AM	UAFACC0	Preferential
71	363.2	AM	UFA etc	Preferential
72	364.2	AM	UAF NORA	Preferential
73	371.8	AM	u	Preferential
74	380.15	AM	u	Preferential
75	381.8	AM	UCG	Preferential
76	383.8	AM	UCG	Preferential
77	384.8	AM	UCG 2	Preferential
78	390	AM	u	Preferential
79	390.8	AM	ORDtower	Preferential
80	393.1	AM	Chi appr	Preferential
81	1000	NFM	e	Off
82	1000	NFM	e	Off
83	1000	NFM	e	Off
84	1000	NFM	e	Off
85	1000	NFM	e	Off
86	1000	NFM	e	Off
87	1000	NFM	e	Off
88	1000	NFM	e	Off
89	1000	NFM	e	Off
90	1000	NFM	e	Off
91	1000	NFM	e	Off
92	1000	NFM	e	Off
93	1000	NFM	e	Off
94	1000	NFM	e	Off
95	1000	NFM	e	Off
96	1000	NFM	e	Off
97	1000	NFM	e	Off
98	1000	NFM	e	Off
99	1000	NFM	e	Off
100	1000	NFM	e	Off
101	26.965	AM	01 CBCB	Off
102	26.975	AM	02 CBCB	Off

Metra www.metrarail.com

Metra System

UP-N	Metra/Union Pacific *North Line* Chicago (OTC) to Kenosha, WI
UP-NW	Metra/Union Pacific *Northwest Line* Chicago (OTC) to Harvard and McHenry
UP-W	Metra/Union Pacific *West Line* Chicago (OTC) to Geneva
MD-N	Metra/Milwaukee District *North Line* Chicago (Union Station) to Fox Lake
MD-W	Metra/Milwaukee District *West Line* Chicago (Union Station) to Elgin/Big Timber
NCS	Metra/North Central Service Chicago (Union Station) to Antioch
BNSF	Metra/Burlington Northern Santa Fe Chicago (Union Station) to Aurora
ME	Metra Electric Chicago (Randolph Street Station) to University Park
HC	Metra/Heritage Corridor Chicago (Union Station) to Joliet
SWS	Metra/SouthWest Service Chicago (Union Station) to Orland Park
RI	Metra/Rock Island District Chicago (LaSalle Street Station) to Joliet
SS	Metra/South Shore Chicago (Randolph Street Station) to South Bend, IN

OTC — *Formerly known as Chicago & North Western Station*

Metra Fare Schedule*

Zone	Monthly	10-Ride	One-Way
A	$47.25	$14.90	$1.75
B	$52.65	$16.60	$1.95
C	$74.25	$23.40	$2.75
D	$85.05	$26.80	$3.15
E	$94.50	$29.75	$3.50
F	$105.30	$33.15	$3.90
G	$116.10	$36.55	$4.30
H	$125.55	$39.55	$4.65
I	$136.35	$42.95	$5.05
J	$147.15	$46.35	$5.45
K	$156.60	$49.30	$5.80
M	$178.20	$56.10	[illegible]

*Fares based on travel to/from downtown Chicago. subject to change. Reduced fares are available for Senior Citizens/Disabled/Student/Children/Military. For details call (312) 836-7000.

licensee	ser	usage	city	frequency	basn	mobn	othnu	othcoc	callsign	sta	volume	expires
WARREN TOWNSHIP OF	R		GURNEE	151.025	1	26	0	BM	WPBS861	IL	4	2
GURNEE VILLAGE OF	L	(DPW/POLICE SECONDARY)	GURNEE	153.92	1	45	0	BM	KLI390	IL	4	1
GURNEE VILLAGE OF	F		GURNEE	154.265	2	85	50	PG	KSF710	IL	4	2
GURNEE VILLAGE OF	F	(DISPATCH)	GURNEE	154.325	2	85	50	PG	KSF710	IL	4	2
ILLINOIS STATE OF	P		GURNEE	154.695	1	0	0	BA	KSB233	IL	4	8
ILLINOIS STATE OF	P		GURNEE	154.695	1	0	0	BA	KSB984	IL	4	1
ILLINOIS STATE OF	P		GURNEE	154.92	1	0	0	BA	KSB233	IL	4	8
GURNEE VILLAGE OF	L		GURNEE	155.055	1	11	0	BM	WQI977	IL	4	6
GURNEE ELEMENTARY SCH DIST #56	S		GURNEE	155.205	1	17	0	BM	KYY200	IL	4	4
GURNEE FUNERAL HOME & AMBUL	S		GURNEE	155.205	1	12	0	BM	WNAJ971	IL	4	9
GURNEE VILLAGE OF	P		GURNEE	155.37	1	0	0	BA	KEF550	IL	4	2
ILLINOIS STATE OF	P		GURNEE	155.46	1	0	0	BA	KSB233	IL	4	8
ILLINOIS STATE OF	P		GURNEE	155.46	1	0	0	BA	KSB984	IL	4	1
ILLINOIS STATE OF	P		GURNEE	155.475	1	0	0	BA	KSB233	IL	4	8
LAKE COUNTY OF	L	(F-2 SHERIFF)	GURNEE	158.94	0	0	1	CO	WOB22	IL	4	1
LAKE COUNTY OF	P		GURNEE	158.97	0	0	1	CO	KSG321	IL	4	1
GURNEE PARK DISTRICT	C		GURNEE	159.435	1	0	0	BA	WPBJ544	IL	4	12

licensee	ser	usage	city	frequency	basn	mobn	othnu	othcoc	callsign	sta	volume	expires
ILLINOIS STATE OF	C	(ILLINOIS BEACH STATE PARK)	ZION	151.28	1	0	0	BA	KNIF491	IL	4	1
ILLINOIS STATE OF	C		ZION	151.28	1	0	0	BA	KNIF492	IL	4	1
ILLINOIS STATE OF	C	(NORTH POINT MARINA)	ZION	151.28	1	0	0	BA	KNIF493	IL	4	1
ILLINOIS STATE OF	C		ZION	151.28	1	0	0	BA	KQR371	IL	4	5
ILLINOIS STATE OF	C		ZION	151.28	0	0	1	MR	WPPC215	IL	4	10
ILLINOIS STATE OF	C		ZION	151.445	1	0	0	BA	KNIF491	IL	4	1
ILLINOIS STATE OF	C		ZION	151.445	1	0	0	BA	KNIF492	IL	4	1
ILLINOIS STATE OF	C		ZION	151.445	1	0	0	BA	KNIF493	IL	4	1
ILLINOIS STATE OF	C		ZION	151.445	1	0	0	BA	KQR371	IL	4	5
ZION CITY OF	F		ZION	154.265	1	0	100	PG	KFX873	IL	4	10
ZION CITY OF	F		ZION	154.265	1	0	0	BA	KLF252	IL	4	10
ZION CITY OF	F		ZION	154.265	1	0	0	BA	KNCL897	IL	4	2
ZION CITY OF	F		ZION	154.325	1	0	100	PG	KFX873	IL	4	10
ZION CITY OF	F		ZION	154.325	2	0	0	BA	KLF252	IL	4	10
ZION CITY OF	F		ZION	154.325	10	0	100	PG	KNCL897	IL	4	2
ZION CITY OF	L		ZION	155.055	1	60	0	BM	WQI988	IL	4	7
MIDWESTERN REGIONAL MED CTR	M		ZION	155.28	10	0	0	BA	WPGQ586	IL	4	2
MIDWESTERN REGIONAL MED CTR	M		ZION	155.34	10	0	0	BA	WPGQ586	IL	4	2
ZION CITY OF	P		ZION	155.37	1	0	0	BA	KBJ355	IL	4	5
MIDWESTERN REGIONAL MED CTR	M		ZION	155.4	10	0	0	BA	WPGQ586	IL	4	2
LAKE COUNTY OF	L		ZION	158.895	0	0	1	CO	WFT900	IL	4	1
LAKE COUNTY OF	L		ZION	158.94	0	0	1	CO	WOB32	IL	4	4
LAKE COUNTY OF	P		ZION	158.97	0	0	1	CO	KSA505	IL	4	4

licensee	ser	usage	city	frequency	basn	mobn	othnu	othcoc	callsign	sta	volume	expires
N CHICAGO CITY OF	F		N CHICAGO	154.265	1	21	35	PG	KJO297	IL	4	10
N CHICAGO CITY OF	F	(DISPATCH)	N CHICAGO	154.325	2	21	35	PG	KJO297	IL	4	10
N CHICAGO CITY OF	L		N CHICAGO	155.055	1	23	0	BM	KNBE942	IL	4	4
N CHICAGO CITY OF	L		N CHICAGO	155.1	1	65	0	BM	KBX597	IL	4	7
N CHICAGO CITY OF	P		N CHICAGO	155.37	1	0	0	BA	KNBA846	IL	4	4
LAKE COUNTY OF	L		N CHICAGO	158.94	0	0	1	CO	WOB23	IL	4	1
LAKE COUNTY OF	P		N CHICAGO	158.97	0	0	1	CO	KSA507	IL	4	1

licensee	ser	usage	city	frequency	basn	mobn	othnu	othcoc	callsign	sta	volume	expires
GRAYSLAKE COMMUNITY PARK DIST	C		GRAYSLAKE	151.22	1	5	0	BM	WNKJ616	IL	4	12
GRAYSLAKE FPD	F		GRAYSLAKE	154.265	1	19	0	BM	KIM643	IL	4	5
GRAYSLAKE FPD	F	(DISPATCH)	GRAYSLAKE	154.4	1	19	0	BM	KIM643	IL	4	5
GRAYSLAKE VILLAGE OF	L		GRAYSLAKE	155.055	1	5	0	BM	WQI976	IL	4	7
GRAYSLAKE COMM HIGH SCH DT 127	S		GRAYSLAKE	155.16	1	25	0	BM	WNFD979	IL	4	1
GRAYSLAKE VILLAGE OF	P		GRAYSLAKE	155.37	1	0	0	BA	WNXB975	IL	4	8
LAKE COUNTY OF	P		GRAYSLAKE	158.97	0	0	1	CO	KSC398	IL	4	1

licensee	ser	usage	city	frequency	basn	mobn	othnu	othcoc	callsign	sta	volume	expires
WAUKEGAN PARK DISTRICT	C		WAUKEGAN	151.25	0	0	1	MR	KNCK882	IL	4	8
WAUKEGAN CITY OF	F		WAUKEGAN	154.265	2	90	0	BM	KNCE599	IL	4	8
LAKE COUNTY OF	F		WAUKEGAN	154.265	1	0	0	BA	WQM625	IL	4	6
WAUKEGAN CITY OF	F		WAUKEGAN	154.325	4	90	0	BM	KNCE599	IL	4	8
WAUKEGAN CITY OF	F	(DISPATCH)	WAUKEGAN	154.415	4	90	0	BM	KNCE599	IL	4	8
LAKE COUNTY OF	S		WAUKEGAN	155.28	1	0	0	BA	KCW437	IL	4	1
VICTORY MEMORIAL HOSPITAL	S		WAUKEGAN	155.28	1	0	0	BA	KWE856	IL	4	9
VICTORY MEMORIAL HOSPITAL	S		WAUKEGAN	155.34	1	0	0	BA	KWE856	IL	4	9
LAKE COUNTY OF	P		WAUKEGAN	155.37	1	0	0	BA	KSA508	IL	4	1
WAUKEGAN CITY OF	P		WAUKEGAN	155.37	1	0	0	BA	WNAK432	IL	4	9
VICTORY MEMORIAL HOSPITAL	S		WAUKEGAN	155.4	1	0	0	BA	KWE856	IL	4	9
LAKE COUNTY OF	P		WAUKEGAN	155.655	0	0	1	MR	KSA958	IL	4	4
LAKE COUNTY OF	P		WAUKEGAN	155.7	0	0	1	MR	WNXI856	IL	4	9
WAUKEGAN PORT DISTRICT	L		WAUKEGAN	155.82	1	6	0	BM	WNJM748	IL	4	8
WAUKEGAN CITY OF	L		WAUKEGAN	155.94	1	235	15	PG	KNES998	IL	4	10
WAUKEGAN CITY OF	L		WAUKEGAN	155.94	0	40	1	MR	WNKU308	IL	4	1
LAKE COUNTY OF	P		WAUKEGAN	156.21	0	0	1	MR	KSA958	IL	4	4
LAKE COUNTY OF	P	(JAIL)	WAUKEGAN	156.21	1	0	0	BA	WNNS231	IL	4	2
LAKE COUNTY OF	L		WAUKEGAN	158.895	0	0	1	CO	WFT875	IL	4	1
LAKE COUNTY OF	L	(SHERIFF F-3)	WAUKEGAN	158.895	2	431	1	CO	WGL413	IL	4	1
LAKE COUNTY OF	L		WAUKEGAN	158.94	0	0	1	CO	WOB24	IL	4	1
LAKE COUNTY OF	L		WAUKEGAN	158.94	0	0	1	CO	WOB25	IL	4	1
LAKE COUNTY OF	P		WAUKEGAN	158.97	0	0	1	CO	KSA506	IL	4	1
WAUKEGAN PARK DISTRICT	C		WAUKEGAN	159.24	1	78	0	BM	KNCK882	IL	4	8

LICENSEE	USAGE	SERVICE	CITY	FREQUENCY	BASE #	MOBILE #	OTHER #	OTHER CODE	CALLSIGN	STATE	VOLUME	EXPIRES	STATE
ADAMS COUNTY OF		L	QUINCY	155.145	1	30	0	BM	KNJL469	IL	4	5	IL
BURR RIDGE TOWN OF	(* DOWNERS GROVE)	L	BURR RIDGE	155.145	1	10	0	BM	KXO672	IL	4	2	IL
CARBON CLIFF VILLAGE OF		L	CARBON CLIFF	155.145	1	15	0	BM	WNZA807	IL	4	4	IL
CARRIER MILLS VILLAGE OF		L	CARRIER MILLS	155.145	1	25	0	BM	WPEM288	IL	4	3	IL
CASEYVILLE VILLAGE OF		L	CASEYVILLE	155.145	1	30	0	BM	KNIT599	IL	4	4	IL
DE KALB CITY OF	(POLICE - TAC 1)	L	DE KALB	155.145	1	60	0	BM	KBV745	IL	4	5	IL
GLENDALE HEIGHTS CITY OF	(POLICE SECONDARY)	L	GLENDALE HTS	155.145	1	35	0	BM	KNIN328	IL	4	3	IL
LA SALLE COUNTY OF	(SHERIFF SECONDARY)	L	OTTAWA	155.145	1	50	0	BM	KAT354	IL	4	5	IL
LOVES PARK CITY OF		L	LOVES PARK	155.145	10	40	1	BR	WPLD264	IL	4	3	IL
MASON COUNTY OF		L		155.145	0	60	0	MO	WPDY427	IL	4	10	IL
MATTOON CITY OF	(ESDA)	L	MATTOON	155.145	1	27	0	BM	KEE995	IL	4	9	IL
MT ZION FPD		L	MT ZION	155.145	1	26	0	BM	KUO877	IL	4	7	IL
ORCHARD TOWNSHIP OF		L	ORCHARDVILLE	155.145	1	7	0	BM	WPCB561	IL	4	4	IL
PEOTONE CITY OF		L	PEOTONE	155.145	1	24	0	BM	KXW476	IL	4	5	IL
PEOTONE CITY OF	(POLICE/FIRE)	L	PEOTONE	155.145	1	26	1	BR	KUJ776	IL	4	5	IL
RAYMOND VILLAGE OF		L	RAYMOND	155.145	1	16	0	BM	WNFE726	IL	4	11	IL
ROBINSON CITY OF		L	ROBINSON	155.145	1	20	0	BM	WSB715	IL	4	9	IL
ROODHOUSE CITY OF		L	ROODHOUSE	155.145	1	12	0	BM	WPGN797	IL	4	2	IL
SADORUS VILLAGE OF		L	SADORUS	155.145	1	8	0	BM	KNCZ423	IL	4	3	IL
STERLING CITY OF		L	STERLING	155.145	1	25	0	BM	KWB773	IL	4	3	IL
WARREN COUNTY OF		R	MONMOUTH	155.145	0	50	1	CO	KNCP295	IL	4	11	IL
WESTMONT VILLAGE OF	(POLICE TAC-1/DPW)	L	WESTMONT	155.145	6	95	0	BM	KRX374	IL	4	10	IL
WILLOWBROOK VILLAGE OF	(POLICE F-2)	L	WILLOWBROOK	155.145	1	10	0	BM	KVQ616	IL	4	7	IL
WOODFORD COUNTY OF	(SHERIFF F-4)	L	EUREKA	155.145	1	##	0	BM	KTE360	IL	4	8	IL
ANSON TOWN OF	(FIRE)	L	JIM FALLS	155.145	1	12	0	BM	KTZ211	WI	4	11	WI
ARLAND TOWN OF		L	BARRON	155.145	1	4	0	BM	WNZC983	WI	4	4	WI
BARKSDALE TOWN OF		L		155.145	0	3	0	MO	WNSE900	WI	4	5	WI
BAYFIELD CITY OF		L	BAYFIELD	155.145	1	10	0	BM	WPGW651	WI	4	3	WI
BAYFIELD COUNTY OF		L		155.145	0	##	##	PG	WPNX669	WI	4	7	WI
CABLE TOWN OF		L		155.145	0	5	0	MO	KD26398	WI	4	4	WI
CHETEK TOWN OF		L	CHETEK	155.145	1	5	0	BM	WNEB942	WI	4	9	WI
CHETEK TOWN OF		L	CHETEK	155.145	1	6	0	BM	WNFJ748	WI	4	12	WI
CRYSTAL LAKE TOWN OF		L	CUMBERLAND	155.145	1	3	0	BM	WNZF314	WI	4	11	WI
DRUMMOND TOWN OF		L	DRUMMOND	155.145	1	6	0	BM	KNJK854	WI	4	5	WI
FT ATKINSON CITY OF	(POLICE F-3)	L	FT ATKINSON	155.145	1	12	0	BM	KNGB550	WI	4	3	WI
GRANT TOWN OF		L	KELLNER	155.145	1	6	0	BM	KNGE455	WI	4	7	WI
GREEN LAKE CITY OF		L	GREEN LAKE	155.145	1	10	5	PG	WNNQ938	WI	4	3	WI
IRON RIVER TOWN OF		L		155.145	0	15	0	MO	WPKJ287	WI	4	3	WI
JACKSON VILLAGE OF		L	JACKSON	155.145	1	25	0	BM	KTV908	WI	4	12	WI
JEFFERSON CITY OF	(POLICE F-3)	L	JEFFERSON	155.145	1	6	10	PG	KNJB814	WI	4	4	WI
JEFFERSON COUNTY OF	(POLICE F-3)	L	JEFFERSON	155.145	1	30	0	BM	KWH778	WI	4	12	WI
KRONENWETTER TOWN OF		L	MOSINEE	155.145	1	18	0	BM	KQS771	WI	4	3	WI
LA CROSSE COUNTY OF		L		155.145	0	50	20	PG	WPSE447	WI	4	3	WI
LAKE MILLS TOWN OF	(POLICE F-3)	L	LAKE MILLS	155.145	1	30	0	BM	KSL792	WI	4	10	WI
MAPLE GROVE TOWN OF		L		155.145	0	7	0	MO	WNZF313	WI	4	4	WI
MENASHA CITY OF	(POLICE F-5/PUBLIC WORKS)	L	MENASHA	155.145	1	10	0	BM	KRZ398	WI	4	12	WI
N HUDSON VILLAGE OF		L	N HUDSON	155.145	1	14	0	BM	WPGS693	WI	4	3	WI
OAK CREEK CITY OF		L	OAK CREEK	155.145	1	0	0	BA	WNVX754	WI	4	4	WI
OULU TOWN OF		L	OULU	155.145	1	10	0	BM	WNZF312	WI	4	4	WI
PALMYRA VILLAGE OF		L	PALMYRA	155.145	1	16	0	BM	KNHT564	WI	4	1	WI
PRAIRIE FARM TOWN OF		L	PRAIRIE FARM	155.145	1	4	0	BM	WNJD831	WI	4	6	WI

PRICE COUNTY OF	(PAGING)	L	PHILLIPS	155.145	0	50	1	MR	WZM940	WI	4	6	WI
PRINCETON CITY OF		L		155.145	0	4	0	MO	WNYJ404	WI	4	1	WI
PRINCETON CITY OF		L	PRINCETON	155.145	1	10	0	BM	KNAJ281	WI	4	11	WI
RED CLIFF CHIPPEWA HSNG AL		L	BAYFIELD	155.145	1	8	0	BM	WPFX414	WI	4	10	WI
SHAWANO COUNTY OF		L		155.145	1	##	1	TR	KYW900	WI	4	9	WI
SHAWANO COUNTY OF	(N COMM FIRE/EMS)	L	ANTIGO	155.145	0	0	1	MR	KYW900	WI	4	9	WI
SHAWANO COUNTY OF	(CENTER COMM)	L	LEOPOLIS	155.145	0	0	1	MR	KYW900	WI	4	9	WI
SHAWANO COUNTY OF	(EAST COMM)	L	SHAWANO	155.145	0	0	1	MR	KYW900	WI	4	9	WI
SHAWANO COUNTY OF	(WEST COMM)	L	WITTENBERG	155.145	0	0	1	MR	KYW900	WI	4	9	WI
SILVER LAKE VILLAGE OF		L	SILVER LAKE	155.145	10	10	0	BM	KKS855	WI	4	7	WI
SOMERS TOWN OF		L	SOMERS	155.145	1	10	0	BM	WNLE367	WI	4	3	WI
STANFORD TOWN OF		L	RICE LAKE	155.145	1	8	0	BM	WPCB559	WI	4	4	WI
VERONA TOWN OF	(POLICE/FIRE)	L	VERONA	155.145	1	7	0	BM	KTM783	WI	4	2	WI
WASHBURN TOWN OF		L		155.145	0	7	0	MO	WPFE684	WI	4	7	WI
WAUNAKEE VILLAGE OF	(POLICE/FIRE)	L	WAUNAKEE	155.145	3	45	0	BM	KZF630	WI	4	3	WI
WINNECONNE VILLAGE OF		L		155.145	0	20	0	MO	WPGS829	WI	4	3	WI
BOYNE CITY CITY OF		L	BOYNE CITY	155.145	1	24	0	BM	WNCE422	MI	3	5	MI
DECKERVILLE VILLAGE OF		L	DECKERVILLE	155.145	1	6	0	BM	WNIK763	MI	3	4	MI
DETROIT CITY OF		L	DETROIT	155.145	1	10	0	BM	KGK715	MI	3	6	MI
ESCANABA CITY OF		L	ESCANABA	155.145	1	20	##	PG	KNHD675	MI	3	11	MI
FARWELL VILLAGE OF		L		155.145	0	5	0	MO	WPCS763	MI	3	7	MI
IRON RIVER CITY OF		L	IRON RIVER	155.145	1	16	20	PG	KVG971	MI	3	8	MI
MICHIGAN STATE OF		L	FREELAND	155.145	0	##	1	MR	WPDD990	MI	3	9	MI
N ADAMS VILLAGE OF		L	N ADAMS	155.145	10	20	20	PG	WPJW440	MI	3	11	MI
OAKLAND COUNTY OF		L	BLOOMFIELD	155.145	0	0	1	OF	KNHF687	MI	3	8	MI
OAKLAND COUNTY OF		L	CLARKSTON	155.145	0	0	1	OF	KNHF687	MI	3	8	MI
OAKLAND COUNTY OF		L	LAKE ORION	155.145	0	0	3	OF	KNHF687	MI	3	8	MI
OAKLAND COUNTY OF		L	OXFORD	155.145	0	0	1	OF	KNHF687	MI	3	8	MI
OAKLAND COUNTY OF		L	PONTIAC	155.145	1	0	0	BA	KRO299	MI	3	12	MI
OAKLAND COUNTY OF		L	ROCHESTER	155.145	0	0	1	OF	KNHF687	MI	3	8	MI
OAKLAND COUNTY OF		L	S LYON	155.145	0	0	1	OF	KNHF687	MI	3	8	MI
OAKLAND COUNTY OF		L	SOUTHFIELD	155.145	0	0	2	OF	KNHF687	MI	3	8	MI
OAKLAND COUNTY OF		L	WALLED LAKE	155.145	0	0	2	OF	KNHF687	MI	3	8	MI
OAKLAND COUNTY OF		L	WATERFORD	155.145	0	0	1	OF	KNHF687	MI	3	8	MI
OAKLAND COUNTY OF		L	WIXOM	155.145	0	0	1	OF	KNHF687	MI	3	8	MI
VICKSBURG VILLAGE OF		L		155.145	0	16	0	MO	WNWZ306	MI	3	8	MI
WALKER CITY OF		L	GRAND RAPIDS	155.145	0	0	1	MR	WNHP738	MI	3	6	MI
WALKER CITY OF		L	WALKER	155.145	0	##	1	MR	WNHP738	MI	3	6	MI

LAKE COUNTY OF	P	ANTIOCH	158.97	0	0	1	CO	KSG776	ILL	4	1	IL
LAKE COUNTY OF	P	BARRINGTON	158.97	0	0	1	CO	WJV29	ILL	4	1	IL
LAKE COUNTY OF	P	BARRINGTON	158.97	0	0	1	CO	KSA501	ILL	4	1	IL
LAKE COUNTY OF	P	BARRINGTON	158.97	0	0	1	CO	WAS542	ILL	4	1	IL
LAKE COUNTY OF	P	BARRINGTON	158.97	0	0	1	CO	KNIE501	ILL	4	12	IL
LAKE COUNTY OF	P	DEERFIELD	158.97	0	0	1	CO	WGJ807	ILL	4	9	IL
LAKE COUNTY OF	P	FOX LAKE	158.97	0	0	1	CO	KSA500	ILL	4	3	IL
LAKE COUNTY OF	P	FOX LAKE	158.97	0	0	1	CO	WGQ858	ILL	4	6	IL
LAKE COUNTY OF	P	GRAYSLAKE	158.97	0	0	1	CO	KSC398	ILL	4	1	IL
LAKE COUNTY OF	P	GURNEE	158.97	0	0	1	CO	KSG321	ILL	4	1	IL
LAKE COUNTY OF	P	ISLAND LAKE	158.97	0	0	1	CO	WJU70	ILL	4	1	IL
LAKE COUNTY OF	P	LAKE ZURICH	158.97	0	0	1	CO	KSE518	ILL	4	1	IL
LAKE COUNTY OF	P	LIBERTYVILLE	158.97	0	0	1	CO	WJZ88	ILL	4	1	IL
LAKE COUNTY OF	P	LIBERTYVILLE	158.97	0	450	3	CO	KSA958	ILL	4	4	IL
LAKE COUNTY OF	P	LINCOLNSHIRE	158.97	0	0	1	CO	KRZ969	ILL	4	1	IL
LAKE COUNTY OF	P	LINDENHURST	158.97	0	0	1	CO	WNPD703	ILL	4	4	IL
LAKE COUNTY OF	P	MUNDELEIN	158.97	0	0	1	CO	KSC402	ILL	4	1	IL
LAKE COUNTY OF	P	N CHICAGO	158.97	0	0	1	CO	KSA507	ILL	4	1	IL
LAKE COUNTY OF	P	PARK CITY	158.97	0	0	1	CO	WAX714	ILL	4	4	IL
LAKE COUNTY OF	P	ROUND LAKE	158.97	0	0	1	CO	KSC400	ILL	4	7	IL
LAKE COUNTY OF	P	ROUND LAKE B	158.97	0	0	1	CO	KSF966	ILL	4	1	IL
LAKE COUNTY OF	P	ROUND LAKE B	158.97	0	0	1	CO	WPBW70	ILL	4	3	IL
LAKE COUNTY OF	P	ROUND LAKE H	158.97	0	0	1	CO	WBR210	ILL	4	1	IL
LAKE COUNTY OF	P	VERNON HILLS	158.97	0	0	1	CO	WAS543	ILL	4	2	IL
LAKE COUNTY OF	P	WAUCONDA	158.97	0	0	1	CO	KSD827	ILL	4	1	IL
LAKE COUNTY OF	P	WAUCONDA	158.97	0	0	1	CO	KNIX215	ILL	4	3	IL
LAKE COUNTY OF	P	WAUKEGAN	158.97	0	0	1	CO	KSA506	ILL	4	1	IL
LAKE COUNTY OF	P	WINTHROP HAF	158.97	0	0	1	CO	KSF921	ILL	4	1	IL
LAKE COUNTY OF	P	ZION	158.97	0	0	1	CO	KSA505	ILL	4	4	IL

Dist 27 Mellford Prairie

ambulance
154.235

Dist 3

Bill E Castro
The Moorings

KSD 486
154.445
tests @
7PM Shop Rp

Regional Emerg. Disp.
prospect Hts
Niles
Winn Rm
Glenview
Northbrook

	Receive Frequency	Receive Mode	Channel Name	Preferential Scan
0	59.75000	WFM	C02aWBBM	☐
1	71.75000	WFM	N04aWTMJ	☐
2	81.75000	WFM	N05aWMAQ	☐
3	87.75000	WFM	F06aWITI	☐
4	179.75000	WFM	A07aWLS	☐
5	185.75000	WFM	?08a????	☐
6	191.75000	WFM	U09aWGN	☐
7	197.75000	WFM	P10aWMVS	☐
8	203.75000	WFM	P11aWTTW	☐
9	209.75000	WFM	?12aWISN	☐
10	215.75000	WFM	?13aWREX	☐
11	475.75000	WFM	?14aWIWB	☐
12	499.75000	WFM	?18aWVTV	☐
13	511.75000	WFM	E20aWYCC	☐
14	529.75000	WFM	?23aWFBT	☐
15	535.75000	WFM	?24aWCGV	☐
16	547.75000	WFM	?26aWCIU	☐
17	571.75000	WFM	?30aWVCY	☐
18	583.75000	WFM	F32aWFLD	☐
19	595.75000	WFM	R34aWJYS	☐
20	607.75000	WFM	?36aWMVS	☐
21	619.75000	WFM	P38aWCPX	☐
22	631.75000	WFM	?40a????	☐
23	655.75000	WFM	S44aWSNS	☐
24	691.75000	WFM	W50aWPWR	☐
25	721.75000	WFM	?55aWPXE	☐
26	727.75000	WFM	?56aWYIN	☐
27	733.75000	WFM	?57W57DN	☐
28	751.75000	WFM	S60aWEHS	☐
29	763.75000	WFM	?62aWTYS	☐
30	775.75000	WFM	?64W64CQ	☐
31	799.75000	WFM	?68W36AO	☐
32	226.30000	AM	2	☑
33	237.90000	AM	UCG S&R	☑
34	239.00000	AM		☑
35	239.80000	AM	UFA Wx	☑
36	239.80000	AM	Pitot to Metro Scott AFB	☑
37	241.00000	AM	UAR	☑
38	242.40000	AM	????? ANG HELOS	☑
39	243.00000	AM	Emergcy	☑
40	252.10000	AM	2	☑
41	255.40000	AM	UFAflsvc	☑
42	257.80000	AM	CivTower	☑
43	257.80000	AM		☑
44	269.50000	AM		☑
45	269.90000	AM		☑
46	284.00000	AM	2	☑
47	287.30000	AM	2 ANG	☑
48	287.80000	AM	UCGrescu	☑
49	288.15000	AM		☑
50	290.20000	AM		☑
51	307.20000	AM	MILheard	☑
52	311.00000	AM	UAF ACC	☑
53	318.00000	AM	UAFACC06	☑
54	319.00000	AM	UFA atc	☑
55	321.00000	AM	UAFACC11	☑
56	324.20000	AM	UAFACC14	☑
57	324.50000	AM	UAFACC12	☑
58	335.80000	AM	UAFACC17	☑
59	336.60000	AM	UAFACC18	☑
60	337.40000	AM		☑
61	339.80000	AM		☑
62	342.50000	AM	UFA Wx	☑
63	344.60000	AM	UFA Wx	☑
64	346.40000	AM	UAFACC04	☑
65	349.00000	AM	UAFACC13	☑
66	349.40000	AM	UAFtower	☑
67	353.60000	AM		☑
68	359.30000	AM	UAFACC03	☑
69	363.80000	AM	UFA atc	☑
70	364.20000	AM	UAFNORAD	☑
71	371.90000	AM		☑
72	380.15000	AM		☑
73	381.80000	AM	UCG	☑
74	383.90000	AM	UCG	☑

	Receive Frequency	Receive Mode	Channel Name	Preferential Scan
75	384.90000	AM	2	☑
76	390.00000	AM	2	☑
77	130.05	AM	MAC	☐
78	134.10	〃	[illegible]	☐
79	47.0	AM	ANG Helos	☐
80				☐
81				☐
82				☐
83				☐
84				☐
85				☐
86				☐
87				☐
88				☐
89				☐
90				☐
91				☐
92				☐
93				☐
94				☐
95				☐
96				☐
97				☐
98				☐
99				☐
100				☐
101	26.96500	AM	01 CBCB	☑
102	26.97500	AM	02 CBCB	☑
103	26.98500	AM	03 CB	☑
104	27.00500	AM	04 CB	☑
105	27.01500	AM	05 CB	☑
106	27.02500	AM	06 CB	☑
107	27.03500	AM	07 CB	☑
108	27.05500	AM	08 CB	☑
109	27.06500	AM	09 CB	☑
110	27.07500	AM	10 CB	☑
111	27.08500	AM	11 CB	☑
112	27.10500	AM	12 CB	☑
113	27.11500	AM	13 CB	☑
114	27.12500	AM	14 CB	☑
115	27.13500	AM	15 CB	☑
116	27.15500	AM	16 CB	☑
117	27.16500	AM	17 CB	☑
118	27.17500	AM	18 CB	☑
119	27.18500	AM	19 CB	☑
120	27.20500	AM	20 CB	☑
121	27.21500	AM	21 CB	☑
122	27.22500	AM	22 CB	☑
123	27.25500	AM	23 CB	☑
124	27.23500	AM	24 CB	☑
125	27.24500	AM	25 CB	☑
126	27.26500	AM	26 CB	☑
127	27.27500	AM	27 CB	☑
128	27.28500	AM	28 CB	☑
129	27.29500	AM	29 CB	☑
130	27.30500	AM	30 CB	☑
131	27.31500	AM	31 CB	☑
132	27.32500	AM	32 CB	☑
133	27.33500	AM	33 CB	☑
134	27.34500	AM	34 CB	☑
135	27.35500	AM	35 CB	☑
136	27.36500	AM	36 CB	☑
137	27.37500	AM	37 CB	☑
138	27.38500	AM	38 CB	☑
139	27.39500	AM	39 CBCB	☑
140	27.40500	AM	40 CBCB	☑
141	156.30000	NFM	06MARINE	☐
142	156.35000	NFM	07MARINE	☐
143	156.40000	NFM	08 M	☐
144	156.45000	NFM	09 M	☐
145	156.50000	NFM	10 M	☐
146	156.55000	NFM	11 M	☐
147	156.60000	NFM	12 M	☐
148	156.65000	NFM	13 M	☐
149	156.70000	NFM	14 M	☐

	Receive Frequency	Receive Mode	Channel Name	Preferential Scan
150	156.75000	NFM	15 M	☐
151	156.80000	NFM	16 M	☐
152	156.85000	NFM	17 M	☐
153	156.90000	NFM	18 M	☐
154	156.95000	NFM	19 M	☐
155	157.00000	NFM	20 M	☐
156	157.05000	NFM	21 M	☐
157	157.10000	NFM	22 M	☐
158	157.15000	NFM	23 M	☐
159	161.80000	NFM	24 M	☐
160	161.85000	NFM	25 M	☐
161	161.90000	NFM	26 M	☐
162	161.95000	NFM	27 M	☐
163	162.00000	NFM	28 M	☐
164	156.27500	NFM	65 M	☐
165	156.32500	NFM	66 M	☐
166	156.37500	NFM	67 M	☐
167	156.42500	NFM	68 M	☐
168	156.47500	NFM	69 M	☐
169	156.52500	NFM	70 M	☐
170	156.57500	NFM	71 M	☐
171	156.62500	NFM	72 M	☐
172	156.67500	NFM	73 M	☐
173	156.72500	NFM	74 M	☐
174	156.87500	NFM	77 M	☐
175	156.92500	NFM	78 M	☐
176	156.97500	NFM	79 M	☐
177	157.02500	NFM	80 M	☐
178	157.07500	NFM	81 M	☐
179	157.12500	NFM	82 M	☐
180	157.17500	NFM	83 M	☐
181	161.82500	NFM	84 M	☐
182	161.87500	NFM	85 M	☐
183	161.92500	NFM	86 M	☐
184	161.97500	NFM	87MARINE	☐
185	157.42500	NFM	88MARINE	☐
186	130.00000	NFM	SCRATCH1	☐
187	130.00000	NFM	13CHFREE	☐
188	124.2	AM	VERYWEAK	615 ☐
189				☐
190				☐
191				☐
192				☐
193				☐
194				☐
195				☐
196				☐
197				☐
198				☐
199				☐
200	6.58600	AM	NYO/Satc	☑
201	6.60400	AM	AV Wx NY	☑
202	9.00800	AM	Mil A/C	☑
203				☐
204		ADD MUF, 5d		☐
205				☐
206			page 570	☐
207				☐
208				☐
209	160.21500	NFM	07 RRRR	☐
210	160.23000	NFM	08 RRRR	☐
211	160.24500	NFM	09 RR	☐
212	160.26000	NFM	10 RR	☐
213	160.27500	NFM	11 RR	☐
214	160.29000	NFM	12 RR	☐
215	160.30500	NFM	13 RR	☐
216	160.32000	NFM	14 RR	☐
217	160.33500	NFM	15 RR	☐
218	160.35000	NFM	16 RR	☐
219	160.36500	NFM	17 RR	☐
220	160.38000	NFM	18 RR	☐
221	160.39500	NFM	19 RR	☐
222	160.41000	NFM	20 RR	☐
223	160.42500	NFM	21 RR	☐
224	160.44000	NFM	22 RR	☐

	Receive Frequency	Receive Mode	Channel Name	Preferential Scan
225	160.45500	NFM	23 RR	☐
226	160.47000	NFM	24 RR	☐
227	160.48500	NFM	25 RR	☐
228	160.50000	NFM	26 RR	☐
229	160.51500	NFM	27 RR	☐
230	160.53000	NFM	28 RR	☐
231	160.54500	NFM	29 RR	☐
232	160.56000	NFM	30 RR	☐
233	160.57500	NFM	31 RR	☐
234	160.59000	NFM	32 RR	☐
235	160.60500	NFM	33 RR	☐
236	160.62000	NFM	34 RR	☐
237	160.63500	NFM	35 RR	☐
238	160.65000	NFM	36 RR	☐
239	160.66500	NFM	37 RR	☐
240	160.68000	NFM	38 RR	☐
241	160.69500	NFM	39 RR	☐
242	160.71000	NFM	40 RR	☐
243	160.72500	NFM	41 RR	☐
244	160.74000	NFM	42 RR	☐
245	160.75500	NFM	43 RR	☐
246	160.77000	NFM	44 RR	☐
247	160.78500	NFM	45 RR	☐
248	160.80000	NFM	46 RR	☐
249	160.81500	NFM	47 RR	☐
250	160.83000	NFM	48 RR	☐
251	160.84500	NFM	49 RR	☐
252	160.86000	NFM	50 RR	☐
253	160.87500	NFM	51 RR	☐
254	160.89000	NFM	52 RR	☐
255	160.90500	NFM	53 RR	☐
256	160.92000	NFM	54 RR	☐
257	160.93500	NFM	55 RR	☐
258	160.95000	NFM	56 RR	☐
259	160.96500	NFM	57 RR	☐
260	160.98000	NFM	58 RR	☐
261	160.99500	NFM	59 RR	☐
262	161.01000	NFM	60 RR	☐
263	161.02500	NFM	61 RR	☐
264	161.04000	NFM	62 RR	☐
265	161.05500	NFM	63 RR	☐
266	161.07000	NFM	64 RR	☐
267	161.08500	NFM	65 RR	☐
268	161.10000	NFM	66 RR	☐
269	161.11500	NFM	67 RR	☐
270	161.13000	NFM	68 RR	☐
271	161.14500	NFM	69 RR	☐
272	161.16000	NFM	70 RR	☐
273	161.17500	NFM	71 RR	☐
274	161.19000	NFM	72 RR	☐
275	161.20500	NFM	73 RR	☐
276	161.22000	NFM	74 RR	☐
277	161.23500	NFM	75 RR	☐
278	161.25000	NFM	76 RR	☐
279	161.26500	NFM	77 RR	☐
280	161.28000	NFM	78 RR	☐
281	161.29500	NFM	79 RR	☐
282	161.31000	NFM	80 RR	☐
283	161.32500	NFM	81 RR	☐
284	161.34000	NFM	82 RR	☐
285	161.35500	NFM	83 RR	☐
286	161.37000	NFM	84 RR	☐
287	161.38500	NFM	85 RR	☐
288	161.40000	NFM	86 RR	☐
289	161.41500	NFM	87 RR	☐
290	161.43000	NFM	88 RR	☐
291	161.44500	NFM	89 RR	☐
292	161.46000	NFM	90 RR	☐
293	161.47500	NFM	91 RR	☐
294	161.49000	NFM	92 RR	☐
295	161.50500	NFM	93 RR	☐
296	161.52000	NFM	94 RR	☐
297	161.53500	NFM	95 RR	☐
298	161.55000	NFM	96 RRRR	☐
299	161.56500	NFM	97 RRRR	☐

	Receive Frequency	Receive Mode	Channel Name	Preferential Scan
300	110.49950	AM	2 WATCH3	☑
301	110.50000	AM	2 WATCH3	☑
302	110.75000	AM		☑
303	110.80000	AM		☑
304	110.90000	AM		☑
305	111.00000	AM		☑
306	111.10000	AM	2	☑
307	111.30000	AM		☑
308	111.60000	AM	2	☑
309	112.30000	AM	5	☑
310	113.20000	AM	3	☑
311	114.50000	AM	2	☑
312	116.80000	AM		☑
313	118.20000	AM	Quad city appr Muskegan Appr	☑
314	118.92500	AM	2 FIRE NAT.	☑
315	119.25000	AM	2	☑
316	119.50000	AM	~~Elkhart Mun Capital City~~	☑
317	119.80000	AM	National Hulman App/Dep / Muskegan City APPR	☑
318	119.95000	AM	MRE HELO atc	☑
319	120.07000	AM		☑
320	120.30000	AM	Ann Arbor	☑
321	120.30000	AM		☑
322	121.15000	AM		☑
323	121.20000	AM	National Monroe County Bloomington / Kalamazoo	☑
324	121.60000	AM	3 Ground Control air-ground	☑
325	121.67500	AM	LOUD	☑
326	121.70000	AM	Milappr National ground control	☑
327	121.95000	AM	Flt Schools	☑
328	121.97500	AM	Flight svc private A/C	☑
329	122.10000	AM	A/C xmit flt service	☑
330	122.25000	AM	Balloons	☑
331	122.35000	AM	flight service	☑
332	122.40000	AM	[illegible]	☑
333	122.50000	AM	A-G A/C xmit flight svc	☑
334	122.85000	AM	Mulham Forest Svc Helo VHF 4	☑
335	122.90000	AM	2 " " VHF2	☑
336	122.92500	AM	Mulham Forest Svc A/C/AC VHF1	☑
337	122.97500	AM	2 unicom/[illegible]	☑
338	123.10000	AM	S&R [illegible]	☑
339	123.50000	AM	Flt Schools/Balloons	☑
340	123.60000	AM	A/P advisory	☑
341	123.70000	AM	123.7 [illegible]	☑
342	123.95000	AM	Intl Enter[illegible]	☑
343	124.05000	AM	Detroit Appr	☑
344	124.10000	AM	MICHIANA Appr	☑
345	124.90000	AM	[illegible]	☑
346	125.45000	AM	[illegible]	☑
347	125.50000	AM	Russ Burke Arts	☑
348	125.60000	AM	GARY Re[illegible]	☑
349	125.70000	AM	2 GRD appr [illegible]	☑
350	125.85000	AM		☑
351	125.95000	AM	QUAD city appr	☑
352	126.05000	AM	2	☑
353	126.15000	AM	Capital A/[illegible]	☑
354	126.20000	AM	Military App O D Approach	☑
355	126.25000	AM	Muskegon City	☑
356	127.12000	AM		☑
357	127.15000	AM	Intl Appr	☑
358	127.50000	AM	Volk Field WI	☑
359	128.35000	AM	ORD approach	☑
360	132.05000	AM	[illegible]	☑
361	132.15000	AM	Ft Wayne APPR	☑
362	132.70000	AM		☑
363	132.75000	AM	4	☑
364	132.85000	AM	2 Champaign Appr	☑
365	135.20000	AM		☑
366	135.25000	AM	Baldwin Field - Quincy	☑
367	135.40000	AM	ex-pop	☐
368	135.52500	AM		☑
369	226.30000	AM	2	☑
370	239.00000	AM	HULMAN [illegible]	☑
371	239.80000	AM		☑
372	252.10000	AM	2 GRISSOM ARB Com[illegible]	☑
373	257.80000	AM		☑
374	269.50000	AM		☑

	Receive Frequency	Receive Mode	Channel Name	Preferential Scan
375	269.90000	AM		☑
376	284.00000	AM	2	☑
377	287.30000	AM	2	☑
378	288.15000	AM	Hulman App/Dep	☑
379	290.20000	AM		☑
380	337.40000	AM		☑
381	339.80000	AM	Hulman [illegible] App/Dep	☑
382	353.60000	AM		☑
383	371.90000	AM		☑
384	380.15000	AM		☑
385	384.90000	AM	~~2 WATCH3~~ ANG	☑
386	390.00000	AM	2 WATCH3	☑
387	125.80	AM	2 WATCH3	617 ☐
388	127.175	AM		620 ☐
389				☐
390				☐
391				☐
392				☐
393				☐
394				☐
395				☐
396				☐
397				☐
398				☐
399				☐
400	121.85000	AM	3	☑
401	124.90000	AM		☑
402	124.95000	AM		☑
403	125.15000	AM		☑
404	126.29950	AM		☑
405	127.20000	AM	KenRad??	☑
406	127.92500	AM		☑
407	128.25000	AM	4Shrinks	☑
408	348.60000	AM	4Shrinks	☑
409				☐
410				☐
411				☐
412				☐
413				☐
414				☐
415				☐
416				☐
417				☐
418				☐
419 / 425				☐
420 / 426				☐
421 / 427				☐
422 / 428				☐
423 / 429				☐
424 / 430				☐
431				☐
432				☐
433				☐
434				☐
435				☐
436				☐
437				☐
438				☐
439				☐
440				☐
441				☐
442				☐
443				☐
444				☐
445				☐
446				☐
447				☐
448				☐
449				☐

	Receive Frequency	Receive Mode	Channel Name	Preferential Scan
450				☐
451				☐
452				☐
453				☐
454				☐
455				☐
456				☐
457				☐
458				☐
459				☐
460				☐
461				☐
462				☐
463				☐
464				☐
465				☐
466				☐
467				☐
468				☐
469				☐
470				☐
471				☐
472				☐
473				☐
474				☐
475	108.40000	AM	AVNOISE	☐
476	108.95000	AM		☐
477	109.20000	AM		☐
478	109.60000	AM		☐
479	109.75000	AM		☐
480	110.00000	AM		☐
481	110.10000	AM		☐
482	110.25000	AM		☐
483	113.00000	AM	VOR	☐
484	113.90000	AM		☐
485	116.80000	AM		☐
486	118.20000	AM		☐
487	123.60000	AM		☐
488	124.60000	AM		☐
489	124.80000	AM	ex-pop	☐
490	125.52500	AM		☐
491	128.05000	AM		☐
492	128.35000	AM		☐
493	133.70000	AM	beacon?	☐
494	134.10000	AM	beacon?	☐
495	134.30000	AM	beacon?	☐
496	393.10000	AM	AVNOISE	☐
497				☐
498				☐
499				☐
500	47.00000	AM	Civ Aero	☑
501	118.00000	AM	MKEappr	☑
502	118.30000	AM	2	☑
503	118.40000	AM	MDWdep	☑
504	118.45000	AM		☑
505	118.50000	AM	BtlCrkAP	☑
506	118.52500	AM	WXRomeov	☑
507	118.55000	AM	SBndappr	☑
508	118.60000	AM	ENWdep	☑
509	118.70000	AM	MDWappr	☑
510	118.80000	AM	MKEappr	☑
511	119.00000	AM	ORDapprE	☑
512	119.10000	AM	MKEdep	☑
513	119.20000	AM	ORDtower	☑
514	119.35000	AM	MDWappr	☑
515	119.35000	AM	MDWappr	☑
516	119.40000	AM	ENW tfc	☑
517	119.65000	AM	MKEdep	☑
518	119.75000	AM	UNIcenwi	☑
519	119.90000	AM	PWKtower	☑
520	120.05000	AM	CTF Wkn	☑
521	120.10000	AM	Saginaw	☑
522	120.50000	AM	Oak-Pon	☑
523	120.55000	AM	ORDappr	☑
524	120.60000	AM		☑
525	120.75000	AM	ORDsouth	☑
526	120.90000	AM	DPA	☑
527	121.00000	AM	Rockford	☑
528	121.30000	AM	DetCtyAP	☑
529	121.35000	AM	Alpena	☑
530	121.37000	AM		☑
531	121.50000	AM	ORDappr	☑
532	121.65000	AM	ENWdep	☑
533	121.90000	AM	GND CTRL	☑
534	122.00000	AM	Indyappr	☑
535	122.15000	AM	FlsrvA/C	☑
536	122.30000	AM	Chi Ctr	☑
537	122.55000	AM	CTF!!!	☑
538	122.70000	AM	Uni	☑
539	122.80000	AM	STLTfc	☑
540	122.95000	AM	UniWkn	☑
541	123.00000	AM	UnicomNA	☑
542	123.05000	AM	Burl AP	☑
543	123.20000	AM	appr ??	☑
544	123.30000	AM	FoxVTec?	☑
545	124.00000	AM		☑
546	124.35000	AM	ORDappr	☑
547	124.60000	AM	Civ Aero	☑
548	124.70000	AM	ORDappr	☑
549	125.52500	AM	WHAT????	☑
550	126.40000	AM	WonDela?	☑
551	126.50000	AM	MKE app	☑
552	126.85000	AM	Detap&dp	☑
553	127.70000	AM	Chi Ctr	☑
554	128.40000	AM	GrRpKent	☑
555	128.45000	AM	ORDapp	☑
556	129.20000	AM	AA	☑
557	129.30000	AM	UAL	☑
558	129.32500	AM	AA	☑
559	129.35000	AM	Arinc	☑
560	129.36000	AM	A-G A/L	☑
561	129.40000	AM	Arinc	☑
562	129.45000	AM	Arinc	☑
563	129.50000	AM	ORDOpsUA	☑
564	129.55000	AM	Delta AL	☑
565	129.90000	AM	A-G	☑
566	129.92500	AM	Contl AL	☑
567	130.10000	AM	Delta AL	☑
568	130.20000	AM	Arinc	☑
569	130.60000	AM	Arinc	☑
570	130.90000	AM	Contin'l	☑
571	131.30000	AM	infltA-A	☑
572	131.45000	AM	Delta	☑
573	131.50000	AM	A-G Mdst	☑
574	131.60000	AM	MKE Ops /Simmons	☑
575	131.65000	AM	Arinc	☑
576	131.72500	AM	Tennaco	☑
577	131.75000	AM	Republic	☑
578	131.80000	AM	Arinc	☑
579	131.90000	AM	NW AL	☑
580	131.92500	AM	Fed X	☑
581	132.00000	AM	MidwestE	☑
582	132.30000	AM	Chi Ctr	☑
583	132.40000	AM	Wkntower	☑
584	133.50000	AM	MDWappr	☑
585	134.40000	AM	Chi Ctr	☑
586	135.15000	AM	Chi Ctr	☑
587	135.65000	AM	GRapKent	☑
588	243.00000	AM	ORD Bs	☑
589	243.00000	AM	Civ Aero	☑
590	122.65000	AM		☑
591	122.30000	AM	Civ Aero	☑
592	126.29950	AM		☑
593				☐
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596				☐
597				☐
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599				☐

FT-1500M Programmer

File Name: Hunt3.cln
Page: 1

Ch	Rx Freq	Rptr	Tone	Step	Pwr	Clk	W/N	Skip	Tag
1	154.0100			5	High		Wide	Only	
2	154.0250			5	High		Wide	Only	
3	154.0400			5	High		Wide	Only	(S2 SIG)
4	154.0550			5	High		Wide	Skip	RLHTSP
5	154.0700			5	High		Wide	Skip	SWCEND
6	154.0850			5	High		Wide	Skip	MCHENS
7	154.1000			5	High		Wide	Skip	MUNDEC
8	154.1150			5	High		Wide	Only	(SIG)
9	154.1300			5	High		Wide	Skip	CHGO F
10	154.1450			5	High		Wide	Only	
11	154.1600			5	High		Wide	Skip	HIGHPF
12	154.1750			5	High		Wide	Skip	DUCOMM
13	154.1900			5	High		Wide	Skip	STWDFD
14	154.2050			5	High		Wide	Skip	PA++FD
15	154.2200			5	High		Wide	Skip	CHGO F
16	154.2350			5	High		Wide	Skip	PALATD
17	154.2500			5	High		Wide	Skip	KENCOF
18	154.2650			5	High		Wide	Skip	~~[illegible]~~ ~~[illegible]~~ DISP DONE
19	154.2800			5	High		Wide	Only	
20	154.2950			5	High		Wide	Skip	(WEAK)
21	154.3100			5	High		Wide	Skip	MANYFD
22	154.3250			5	High		Wide	Skip	GURNED
23	154.3400			5	High		Wide	Skip	REGEMD
24	154.3550			5	High		Wide	Only	REGEMD
25	154.3700			5	High		Wide	Skip	RACF+R
26	154.3850			5	High		Wide	Skip	MCHENF
27	154.4000			5	High		Wide	Skip	STWIDF
28	154.4150			5	High		Wide	Skip	WAUKED
29	154.4300			5	High		Wide	Skip	LIBERF
30	154.4450			5	High		Wide	Skip	REGEMD
31	154.4900			5	High		Wide	Skip	(NONSTD)
32	154.5150			5	High		Wide	Skip	(BUS)
33	154.5400			5	High		Wide	Skip	(BUS)
34	154.5700			5	High		Wide	Skip	(BUS)
35	154.5850			5	High		Wide	Only	Chatty operator
36	154.6000			5	High		Wide	Skip	(BUS)
37	154.6250			5	High		Wide	Skip	(BUS)
38	154.6400			5	High		Wide	Only	
39	154.6500			5	High		Wide	Skip	~~ILO US~~ SOS DIST 15 U-U
40	154.6650			5	High		Wide	Only	IL DIST 15 U-U
41	154.6800			5	High		Wide	Only	(SIG)
42	154.6950			5	High		Wide	Skip	STPDEL
43	154.7100			5	High		Wide	Skip	
44	154.7250			5	High		Wide	Skip	(WEAK)
45	154.7400			5	High		Wide	Skip	ALGQNP
46	154.7550			5	High		Wide	Skip	RACINS
47	154.7700			5	High		Wide	Skip	(WEAK)
48	154.7850			5	High		Wide	Skip	PKRDGP
49	154.8000			5	High		Wide	Skip	LAGRPP
50	154.8150			5	High		Wide	Only	(SIG)
51	154.8300			5	High		Wide	Skip	(WEAK)
52	154.8450			5	High		Wide	Skip	RACINS
53	154.8600			5	High		Wide	Skip	DEKALS
54	154.8750			5	High		Wide	Skip	BRISTP
55	154.8900			5	High		Wide	Only	(POPS)
56	154.9050			5	High		Wide	Only	
57	154.9200			5	High		Wide	Skip	ILGURS
58	154.9350			5	High		Wide	Only	
59	154.9500			5	High		Wide	Skip	ILHF3S
60	154.9650			5	High		Wide	Skip	ILHF3S
61	154.9800			5	High		Wide	Skip	RNDLPP
62	154.9950			5	High		Wide	Skip	COOK S
63	155.0100			5	High		Wide	Skip	ADISNP
64	155.0250			5	High		Wide	Skip	(MANY L)
65	155.0400			5	High		Wide	Skip	ISLLKP
66	155.0550			5	High		Wide	Skip	ILHF3S
67	155.0700			5	High		Wide	Skip	(WEAK)
68	155.0850			5	High		Wide	Only	(SIG)
69	155.1000			5	High		Wide	Skip	NOCHIP
70	155.1150			5	High		Wide	Only	~~(SIG)~~ ~~RLBEAW~~ DONE
71	155.1300			5	High		Wide	Skip	ELGINP

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Ch	Rx Freq	Rptr	Tone	Step	Pwr	Clk	W/N	Skip	Tag
72	155.1450			5	High		Wide	Only	(SIG)
73	155.1600			5	High		Wide	Skip	(BUS)
74	155.1750			5	High		Wide	Skip	(BUS)
75	155.1900			5	High		Wide	Only	
76	155.2050			5	High		Wide	Skip	(BUS) GURN
77	155.2200			5	High		Wide	Skip	(BUS)
78	155.2350			5	High		Wide	Skip	(BUS)
79	155.2500			5	High		Wide	Skip	(WEAK)
80	155.2650			5	High		Wide	Skip	(BUS)
81	155.2800			5	High		Wide	Skip	MEDEME
82	155.2950			5	High		Wide	Skip	(BUS)
83	155.3100			5	High		Wide	Skip	RNDLKP
84	155.3250			5	High		Wide	Only	
85	155.3400			5	High		Wide	Skip	MEDEME
86	155.3550			5	High		Wide	Skip	REGEMD
87	155.3700			5	High		Wide	Skip	LAKE S
88	155.3850			5	High		Wide	Skip	KENOSM
89	155.4000			5	High		Wide	Skip	MEDEME
90	155.4150			5	High		Wide	Skip	KENOSS
91	155.4300			5	High		Wide	Skip	MEDEME
92	155.4450			5	High		Wide	Skip	WIRACS
93	155.4600			5	High		Wide	Skip	ILGURS
94	155.4750			5	High		Wide	Skip	ISPERN
95	155.4900			5	High		Wide	Skip	KENOSS
96	155.5050			5	High		Wide	Skip	ILMOEX
97	155.5200			5	High		Wide	Skip	POPS
98	155.5350			5	High		Wide	Skip	COOK S
99	155.5500			5	High		Wide	Skip	RACINP
100	155.5650			5	High		Wide	Skip	LBLUFP
101	155.5800			5	High		Wide	Skip	KENOSS
102	155.5950			5	High		Wide	Skip	COOK S
103	155.6100			5	High		Wide	Skip	WINHAD
104	155.6250			5	High		Wide	Skip	PP 2
105	155.6400			5	High		Wide	Skip	MILWAP
106	155.6500			5	High		Wide	Only	
107	155.6700			5	High		Wide	Only	WEAK
108	155.6850			5	High		Wide	Skip	(WEAK)
109	155.7000			5	High		Wide	Skip	CRYSTP
110	155.7150			5	High		Wide	Skip	PKRDGP
111	155.7300			5	High		Wide	Skip	LKFORP
112	155.7450			5	High		Wide	Skip	DESPLP
113	155.7600			5	High		Wide	Skip	RACINW
114	155.7750			5	High		Wide	Skip	(POPS)
115	155.7900			5	High		Wide	Skip	MCHENS
116	155.8050			5	High		Wide	Only	(SIG) HAM
117	155.8200			5	High		Wide	Skip	FDPAGE
118	155.8350			5	High		Wide	Skip	LKZURD
119	155.8500			5	High		Wide	Skip	LFORUU
120	155.8650			5	High		Wide	Only	(SIG)
121	155.8800			5	High		Wide	Skip	ROUNLP
122	155.8950			5	High		Wide	Only	
123	155.9100			5	High		Wide	Only	
124	155.9250			5	High		Wide	Only	~~(SIG)~~ DESPLW
125	155.9400			5	High		Wide	Skip	WAUKEC
126	155.9550			5	High		Wide	Skip	KENOSS
127	155.9700	RLBEAP		5	High		Wide	Only	~~(SIG)~~ DONE
128	155.9850			5	High		Wide	Only	(SIG)
129	156.0000			5	High		Wide	Only	
130	155.7900			5	High		Wide	Skip	MCHENS
L1	144.3000			5	High		Wide	Skip	2M L
U1	148.0000			5	High		Wide	Skip	2M U
L2	154.0000			5	High		Wide	Skip	54-55L
U2	155.0000			5	High		Wide	Skip	54-55U
L3	155.0000			5	High		Wide	Skip	55-56L
U3	156.0000			5	High		Wide	Skip	55-56U
L4	156.0000			5	High		Wide	Skip	56-57L
U4	157.0000			5	High		Wide	Skip	56-57U
L5	157.0000			5	High		Wide	Skip	57-58L
U5	158.0000			5	High		Wide	Skip	57-58U

Tone	Step	Pwr	Clk	W/N	Skip	Tag
	5	High		Wide	Only	
	5	High		Wide	Only	
	5	High		Wide	Only	(S2 SIG)
	5	High		Wide	Skip	RLHTSP
	5	High		Wide	Skip	SWCEND
	5	High		Wide	Skip	MCHENS
	5	High		Wide	Skip	MUNDEC
	5	High		Wide	Only	(SIG)
	5	High		Wide	Skip	CHGO F
	5	High		Wide	Only	SIG
	5	High		Wide	Skip	HIGHPF
	5	High		Wide	Skip	DUCOMM
	5	High		Wide	Skip	STWDFD
	5	High		Wide	Skip	PA++FD
	5	High		Wide	Skip	CHGO F
	5	High		Wide	Skip	PALATD
	5	High		Wide	Skip	KENCOF
	5	High		Wide	Skip	LAKESD
	5	High		Wide	Only	
	5	High		Wide	Skip	(WEAK)
	5	High		Wide	Skip	MANYFD
	5	High		Wide	Skip	GURNED
	5	High		Wide	Skip	REGEMD
	5	High		Wide	Skip	REGEMD
	5	High		Wide	Skip	RACF+R
	5	High		Wide	Skip	MCHENF
	5	High		Wide	Skip	STWIDF
	5	High		Wide	Skip	WAUKED
	5	High		Wide	Skip	LIBERF
	5	High		Wide	Skip	REGEMD
	5	High		Wide	Skip	(NONSTD)
	5	High		Wide	Skip	(BUS)
	5	High		Wide	Skip	(BUS)
	5	High		Wide	Skip	(BUS)
	5	High		Wide	Skip	CHATTY
	5	High		Wide	Skip	(BUS)
	5	High		Wide	Skip	(BUS)
	5	High		Wide	Only	
	5	High		Wide	Skip	SOS15U
	5	High		Wide	Skip	IL15UU
	5	High		Wide	Only	(SIG)
	5	High		Wide	Skip	STPDEL
	5	High		Wide	Only	SIG
	5	High		Wide	Skip	(WEAK)
	5	High		Wide	Skip	ALGQNP
	5	High		Wide	Skip	RACINS
	5	High		Wide	Skip	(WEAK)
	5	High		Wide	Skip	PKRDGP
	5	High		Wide	Skip	LAGRPP
	5	High		Wide	Only	(SIG)
	5	High		Wide	Skip	(WEAK)
	5	High		Wide	Skip	RACINS
	5	High		Wide	Skip	DEKALS
	5	High		Wide	Skip	BRISTP
	5	High		Wide	Skip	(POPS)
	5	High		Wide	Only	
	5	High		Wide	Skip	ILGURS
	5	High		Wide	Only	
	5	High		Wide	Skip	ILHF3S
	5	High		Wide	Skip	ILHF3S
	5	High		Wide	Skip	RNDLPP
	5	High		Wide	Skip	COOK S
	5	High		Wide	Skip	ADISNP
	5	High		Wide	Skip	(MANY L)
	5	High		Wide	Skip	ISLLKP
	5	High		Wide	Skip	ILHF3S
	5	High		Wide	Skip	(WEAK)
	5	High		Wide	Skip	UCH+++
	5	High		Wide	Skip	NOCHIP
	5	High		Wide	Skip	RLBEAW
	5	High		Wide	Skip	ELGINP

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Ch	Rx Freq	Rptr	Tone	Step	Pwr	Clk	W/N	Skip	Tag
72	155.1450			5	High		Wide	Only	(SIG)
73	155.1600			5	High		Wide	Skip	(BUS)
74	155.1750			5	High		Wide	Skip	(BUS)
75	155.1900			5	High		Wide	Only	SIG
76	155.2050			5	High		Wide	Skip	(BUS)
77	155.2200			5	High		Wide	Skip	(BUS)
78	155.2350			5	High		Wide	Skip	(BUS)
79	155.2500			5	High		Wide	Skip	(WEAK)
80	155.2650			5	High		Wide	Skip	(BUS)
81	155.2800			5	High		Wide	Skip	MEDEME
82	155.2950			5	High		Wide	Skip	(BUS)
83	155.3100			5	High		Wide	Skip	RNDLKP
84	155.3250			5	High		Wide	Only	
85	155.3400			5	High		Wide	Skip	MEDEME
86	155.3550			5	High		Wide	Skip	REGEMD
87	155.3700			5	High		Wide	Skip	LAKE S
88	155.3850			5	High		Wide	Skip	KENOSM
89	155.4000			5	High		Wide	Skip	MEDEME
90	155.4150			5	High		Wide	Skip	KENOSS
91	155.4300			5	High		Wide	Skip	MEDEME
92	155.4450			5	High		Wide	Skip	WIRACS
93	155.4600			5	High		Wide	Skip	ILGURS
94	155.4750			5	High		Wide	Skip	ISPERN
95	155.4900			5	High		Wide	Skip	KENOSS
96	155.5050			5	High		Wide	Skip	ILMOEX
97	155.5200			5	High		Wide	Skip	POPS
98	155.5350			5	High		Wide	Skip	COOK S
99	155.5500			5	High		Wide	Skip	RACINP
100	155.5650			5	High		Wide	Skip	LBLUFP
101	155.5800			5	High		Wide	Skip	KENOSS
102	155.5950			5	High		Wide	Skip	COOK S
103	155.6100			5	High		Wide	Skip	WINHAD
104	155.6250			5	High		Wide	Skip	PP 2
105	155.6400			5	High		Wide	Skip	MILWAP
106	155.6500			5	High		Wide	Only	
107	155.6700			5	High		Wide	Only	WEAK
108	155.6850			5	High		Wide	Skip	(WEAK)
109	155.7000			5	High		Wide	Skip	CRYSTP
110	155.7150			5	High		Wide	Skip	PKRDGP
111	155.7300			5	High		Wide	Skip	LKFORP
112	155.7450			5	High		Wide	Skip	DESPLP
113	155.7600			5	High		Wide	Skip	RACINW
114	155.7750			5	High		Wide	Skip	(POPS)
115	155.7900			5	High		Wide	Skip	MCHENS
116	155.8050			5	High		Wide	Skip	TRANS
117	155.8200			5	High		Wide	Skip	FDPAGE
118	155.8350			5	High		Wide	Skip	LKZURD
119	155.8500			5	High		Wide	Skip	LFORUU
120	155.8650			5	High		Wide	Only	(SIG)
121	155.8800			5	High		Wide	Skip	ROUNLP
122	155.8950			5	High		Wide	Only	
123	155.9100			5	High		Wide	Only	
124	155.9250			5	High		Wide	Skip	DESPLW
125	155.9400			5	High		Wide	Skip	WAUKEC
126	155.9550			5	High		Wide	Skip	KENOSS
127	155.9700			5	High		Wide	Only	RLBEAP
128	155.9850			5	High		Wide	Only	(SIG)
129	156.0000			5	High		Wide	Only	
130	156.0000			5	High		Wide	Skip	
L1	144.3000			5	High		Wide	Skip	2M L
U1	148.0000			5	High		Wide	Skip	2M U
L2	154.0000			5	High		Wide	Skip	54-55L
U2	155.0000			5	High		Wide	Skip	54-55U
L3	155.0000			5	High		Wide	Skip	55-56L
U3	156.0000			5	High		Wide	Skip	55-56U
L4	156.0000			5	High		Wide	Skip	56-57L
U4	157.0000			5	High		Wide	Skip	56-57U
L5	157.0000			5	High		Wide	Skip	57-58L
U5	158.0000			5	High		Wide	Skip	57-58U

FT-1500M Programmer

File Name: Hunt3r.cln
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Ch	Rx Freq	Rptr	Tone	Step	Pwr	Clk	W/N	Skip	Tag
1	154.0100			5	High		Wide	Only	
2	154.0250			5	High		Wide	Only	
3	154.0400			5	High		Wide	Only	(S2 SIG)
4	154.0550			5	High		Wide	Skip	RLHTSP
5	154.0700			5	High		Wide	Skip	SWCEND
6	154.0850			5	High		Wide	Skip	MCHENS
7	154.1000			5	High		Wide	Skip	MUNDEC
8	154.1150			5	High		Wide	Only	(SIG)
9	154.1300			5	High		Wide	Skip	CHGO F
10	154.1450			5	High		Wide	Only	SIG
11	154.1600			5	High		Wide	Skip	HIGHPF
12	154.1750			5	High		Wide	Skip	DUCOMM
13	154.1900			5	High		Wide	Skip	STWDFD
14	154.2050			5	High		Wide	Skip	PA++FD
15	154.2200			5	High		Wide	Skip	CHGO F
16	154.2350			5	High		Wide	Skip	PALATD
17	154.2500			5	High		Wide	Skip	KENCOF
18	154.2650			5	High		Wide	Skip	LAKESD
19	154.2800			5	High		Wide	Only	
20	154.2950			5	High		Wide	Skip	(WEAK)
21	154.3100			5	High		Wide	Skip	MANYFD
22	154.3250			5	High		Wide	Skip	GURNED
23	154.3400			5	High		Wide	Skip	REGEMD
24	154.3550			5	High		Wide	Skip	REGEMD
25	154.3700			5	High		Wide	Skip	RACF+R
26	154.3850			5	High		Wide	Skip	MCHENF
27	154.4000			5	High		Wide	Skip	STWIDF
28	154.4150			5	High		Wide	Skip	WAUKED
29	154.4300			5	High		Wide	Skip	LIBERF
30	154.4450			5	High		Wide	Skip	REGEMD
31	154.4900			5	High		Wide	Skip	(NONSTD)
32	154.5150			5	High		Wide	Skip	(BUS)
33	154.5400			5	High		Wide	Skip	(BUS)
34	154.5700			5	High		Wide	Skip	(BUS)
35	154.5850			5	High		Wide	Skip	CHATTY
36	154.6000			5	High		Wide	Skip	(BUS)
37	154.6250			5	High		Wide	Skip	(BUS)
38	154.6400			5	High		Wide	Only	
39	154.6500			5	High		Wide	Skip	SOS15U
40	154.6650			5	High		Wide	Skip	IL15UU
41	154.6800			5	High		Wide	Only	(SIG)
42	154.6950			5	High		Wide	Skip	STPDEL
43	154.7100			5	High		Wide	Only	SIG
44	154.7250			5	High		Wide	Skip	(WEAK)
45	154.7400			5	High		Wide	Skip	ALGQNP
46	154.7550			5	High		Wide	Skip	RACINS
47	154.7700			5	High		Wide	Skip	(WEAK)
48	154.7850			5	High		Wide	Skip	PKRDGP
49	154.8000			5	High		Wide	Skip	LAGRPP
50	154.8150			5	High		Wide	Only	(SIG)
51	154.8300			5	High		Wide	Skip	(WEAK)
52	154.8450			5	High		Wide	Skip	RACINS
53	154.8600			5	High		Wide	Skip	DEKALS
54	154.8750			5	High		Wide	Skip	BRISTP
55	154.8900			5	High		Wide	Skip	(POPS)
56	154.9050			5	High		Wide	Only	
57	154.9200			5	High		Wide	Skip	ILGURS
58	154.9350			5	High		Wide	Only	
59	154.9500			5	High		Wide	Skip	ILHF3S
60	154.9650			5	High		Wide	Skip	ILHF3S
61	154.9800			5	High		Wide	Skip	RNDLPP
62	154.9950			5	High		Wide	Skip	COOK S
63	155.0100			5	High		Wide	Skip	ADISNP
64	155.0250			5	High		Wide	Skip	(MANY L)
65	155.0400			5	High		Wide	Skip	ISLLKP
66	155.0550			5	High		Wide	Skip	ILHF3S
67	155.0700			5	High		Wide	Skip	(WEAK)
68	155.0850			5	High		Wide	Skip	UCH+++
69	155.1000			5	High		Wide	Skip	NOCHIP
70	155.1150			5	High		Wide	Skip	RLBEAW
71	155.1300			5	High		Wide	Skip	ELGINP

FT-1500M Programmer

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Ch	Rx Freq	Rptr	Tone	Step	Pwr	Clk	W/N	Skip	Tag
72	155.1450			5	High		Wide	Only	(SIG)
73	155.1600			5	High		Wide	Skip	(BUS)
74	155.1750			5	High		Wide	Skip	(BUS)
75	155.1900			5	High		Wide	Only	SIG
76	155.2050			5	High		Wide	Skip	(BUS)
77	155.2200			5	High		Wide	Skip	(BUS)
78	155.2350			5	High		Wide	Skip	(BUS)
79	155.2500			5	High		Wide	Skip	(WEAK)
80	155.2650			5	High		Wide	Skip	(BUS)
81	155.2800			5	High		Wide	Skip	MEDEME
82	155.2950			5	High		Wide	Skip	(BUS)
83	155.3100			5	High		Wide	Skip	RNDLKP
84	155.3250			5	High		Wide	Only	
85	155.3400			5	High		Wide	Skip	MEDEME
86	155.3550			5	High		Wide	Skip	REGEMD
87	155.3700			5	High		Wide	Skip	LAKE S
88	155.3850			5	High		Wide	Skip	KENOSM
89	155.4000			5	High		Wide	Skip	MEDEME
90	155.4150			5	High		Wide	Skip	KENOSS
91	155.4300			5	High		Wide	Skip	MEDEME
92	155.4450			5	High		Wide	Skip	WIRACS
93	155.4600			5	High		Wide	Skip	ILGURS
94	155.4750			5	High		Wide	Skip	ISPERN
95	155.4900			5	High		Wide	Skip	KENOSS
96	155.5050			5	High		Wide	Skip	ILMOEX
97	155.5200			5	High		Wide	Skip	POPS
98	155.5350			5	High		Wide	Skip	COOK S
99	155.5500			5	High		Wide	Skip	RACINP
100	155.5650			5	High		Wide	Skip	LBLUFP
101	155.5800			5	High		Wide	Skip	KENOSS
102	155.5950			5	High		Wide	Skip	COOK S
103	155.6100			5	High		Wide	Skip	WINHAD
104	155.6250			5	High		Wide	Skip	PP 2
105	155.6400			5	High		Wide	Skip	MILWAP
106	155.6500			5	High		Wide	Only	
107	155.6700			5	High		Wide	Only	WEAK
108	155.6850			5	High		Wide	Skip	(WEAK)
109	155.7000			5	High		Wide	Skip	CRYSTP
110	155.7150			5	High		Wide	Skip	PKRDGP
111	155.7300			5	High		Wide	Skip	LKFORP
112	155.7450			5	High		Wide	Skip	DESPLP
113	155.7600			5	High		Wide	Skip	RACINW
114	155.7750			5	High		Wide	Skip	(POPS)
115	155.7900			5	High		Wide	Skip	MCHENS
116	155.8050			5	High		Wide	Skip	TRANS
117	155.8200			5	High		Wide	Skip	FDPAGE
118	155.8350			5	High		Wide	Skip	LKZURD
119	155.8500			5	High		Wide	Skip	LFORUU
120	155.8650			5	High		Wide	Only	(SIG)
121	155.8800			5	High		Wide	Skip	ROUNLP
122	155.8950			5	High		Wide	Only	
123	155.9100			5	High		Wide	Only	
124	155.9250			5	High		Wide	Skip	DESPLW
125	155.9400			5	High		Wide	Skip	WAUKEC
126	155.9550			5	High		Wide	Skip	KENOSS
127	155.9700			5	High		Wide	Only	RLBEAP
128	155.9850			5	High		Wide	Only	(SIG)
129	156.0000			5	High		Wide	Only	
130	156.0000			5	High		Wide	Skip	
L1	144.3000			5	High		Wide	Skip	2M L
U1	148.0000			5	High		Wide	Skip	2M U
L2	154.0000			5	High		Wide	Skip	54-55L
U2	155.0000			5	High		Wide	Skip	54-55U
L3	155.0000			5	High		Wide	Skip	55-56L
U3	156.0000			5	High		Wide	Skip	55-56U
L4	156.0000			5	High		Wide	Skip	56-57L
U4	157.0000			5	High		Wide	Skip	56-57U
L5	157.0000			5	High		Wide	Skip	57-58L
U5	158.0000			5	High		Wide	Skip	57-58U

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File Name: Hunt3r.cln
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Ch	Rx Freq	Rptr	Tone	Step	Pwr	Clk	W/N	Skip	Tag
1	154.0100			5	High		Wide	Only	
2	154.0250			5	High		Wide	Only	
3	154.0400			5	High		Wide	Only	(S2 SIG)
4	154.0550			5	High		Wide	Skip	RLHTSP
5	154.0700			5	High		Wide	Skip	SWCEND
6	154.0850			5	High		Wide	Skip	MCHENS
7	154.1000			5	High		Wide	Skip	MUNDEC
8	154.1150			5	High		Wide	Only	(SIG)
9	154.1300			5	High		Wide	Skip	CHGO F
10	154.1450			5	High		Wide	Only	SIG
11	154.1600			5	High		Wide	Skip	HIGHPF
12	154.1750			5	High		Wide	Skip	DUCOMM
13	154.1900			5	High		Wide	Skip	STWDFD
14	154.2050			5	High		Wide	Skip	PA++FD
15	154.2200			5	High		Wide	Skip	CHGO F
16	154.2350			5	High		Wide	Skip	PALATD
17	154.2500			5	High		Wide	Skip	KENCOF
18	154.2650			5	High		Wide	Skip	LAKESD
19	154.2800			5	High		Wide	Only	
20	154.2950			5	High		Wide	Skip	(WEAK)
21	154.3100			5	High		Wide	Skip	MANYFD
22	154.3250			5	High		Wide	Skip	GURNED
23	154.3400			5	High		Wide	Skip	REGEMD
24	154.3550			5	High		Wide	Skip	REGEMD
25	154.3700			5	High		Wide	Skip	RACF+R
26	154.3850			5	High		Wide	Skip	MCHENF
27	154.4000			5	High		Wide	Skip	STWIDF
28	154.4150			5	High		Wide	Skip	WAUKED
29	154.4300			5	High		Wide	Skip	LIBERF
30	154.4450			5	High		Wide	Skip	REGEMD
31	154.4900			5	High		Wide	Skip	(NONSTD)
32	154.5150			5	High		Wide	Skip	(BUS)
33	154.5400			5	High		Wide	Skip	(BUS)
34	154.5700			5	High		Wide	Skip	(BUS)
35	154.5850			5	High		Wide	Skip	CHATTY
36	154.6000			5	High		Wide	Skip	(BUS)
37	154.6250			5	High		Wide	Skip	(BUS)
38	154.6400			5	High		Wide	Only	Mobile
39	154.6500			5	High		Wide	Skip	SOS15U
40	154.6650			5	High		Wide	Skip	IL15UU
41	154.6800			5	High		Wide	Only	(SIG)
42	154.6950			5	High		Wide	Skip	STPDEL
43	154.7100			5	High		Wide	Only	SIG
44	154.7250			5	High		Wide	Skip	(WEAK)
45	154.7400			5	High		Wide	Skip	ALGQNP
46	154.7550			5	High		Wide	Skip	RACINS
47	154.7700			5	High		Wide	Skip	(WEAK)
48	154.7850			5	High		Wide	Skip	PKRDGP
49	154.8000			5	High		Wide	Skip	LAGRPP
50	154.8150			5	High		Wide	Only	(SIG)
51	154.8300			5	High		Wide	Skip	(WEAK)
52	154.8450			5	High		Wide	Skip	RACINS
53	154.8600			5	High		Wide	Skip	DEKALS
54	154.8750			5	High		Wide	Skip	BRISTP
55	154.8900			5	High		Wide	Skip	(POPS)
56	154.9050			5	High		Wide	Only	
57	154.9200			5	High		Wide	Skip	ILGURS
58	154.9350			5	High		Wide	Only	
59	154.9500			5	High		Wide	Skip	ILHF3S
60	154.9650			5	High		Wide	Skip	ILHF3S
61	154.9800			5	High		Wide	Skip	RNDLPP
62	154.9950			5	High		Wide	Skip	COOK S
63	155.0100			5	High		Wide	Skip	ADISNP
64	155.0250			5	High		Wide	Skip	(MANY L)
65	155.0400			5	High		Wide	Skip	ISLLKP
66	155.0550			5	High		Wide	Skip	ILHF3S
67	155.0700			5	High		Wide	Skip	(WEAK)
68	155.0850			5	High		Wide	Skip	UCH+++
69	155.1000			5	High		Wide	Skip	NOCHIP
70	155.1150			5	High		Wide	Skip	RLBEAW
71	155.1300			5	High		Wide	Skip	ELGINP

FT-1500M Programmer

File Name: Hunt3r.cln
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Ch	Rx Freq	Rptr	Tone	Step	Pwr	Clk	W/N	Skip	Tag
72	155.1450			5	High		Wide	Only	(SIG)
73	155.1600			5	High		Wide	Skip	(BUS)
74	155.1750			5	High		Wide	Skip	(BUS)
75	155.1900			5	High		Wide	Only	SIG
76	155.2050			5	High		Wide	Skip	(BUS)
77	155.2200			5	High		Wide	Skip	(BUS)
78	155.2350			5	High		Wide	Skip	(BUS)
79	155.2500			5	High		Wide	Skip	(WEAK)
80	155.2650			5	High		Wide	Skip	(BUS)
81	155.2800			5	High		Wide	Skip	MEDEME
82	155.2950			5	High		Wide	Skip	(BUS)
83	155.3100			5	High		Wide	Skip	RNDLKP
84	155.3250			5	High		Wide	Only	
85	155.3400			5	High		Wide	Skip	MEDEME
86	155.3550			5	High		Wide	Skip	REGEMD
87	155.3700			5	High		Wide	Skip	LAKE S
88	155.3850			5	High		Wide	Skip	KENOSM
89	155.4000			5	High		Wide	Skip	MEDEME
90	155.4150			5	High		Wide	Skip	KENOSS
91	155.4300			5	High		Wide	Skip	MEDEME
92	155.4450			5	High		Wide	Skip	WIRACS
93	155.4600			5	High		Wide	Skip	ILGURS
94	155.4750			5	High		Wide	Skip	ISPERN
95	155.4900			5	High		Wide	Skip	KENOSS
96	155.5050			5	High		Wide	Skip	ILMOEX
97	155.5200			5	High		Wide	Skip	POPS
98	155.5350			5	High		Wide	Skip	COOK S
99	155.5500			5	High		Wide	Skip	RACINP
100	155.5650			5	High		Wide	Skip	LBLUFP
101	155.5800			5	High		Wide	Skip	KENOSS
102	155.5950			5	High		Wide	Skip	COOK S
103	155.6100			5	High		Wide	Skip	WINHAD
104	155.6250			5	High		Wide	Skip	PP 2
105	155.6400			5	High		Wide	Skip	MILWAP
106	155.6500			5	High		Wide	Only	
107	155.6700			5	High		Wide	Only	WEAK
108	155.6850			5	High		Wide	Skip	(WEAK)
109	155.7000			5	High		Wide	Skip	CRYSTP
110	155.7150			5	High		Wide	Skip	PKRDGP
111	155.7300			5	High		Wide	Skip	LKFORP
112	155.7450			5	High		Wide	Skip	DESPLP
113	155.7600			5	High		Wide	Skip	RACINW
114	155.7750			5	High		Wide	Skip	(POPS)
115	155.7900			5	High		Wide	Skip	MCHENS
116	155.8050			5	High		Wide	Skip	TRANS
117	155.8200			5	High		Wide	Skip	FDPAGE
118	155.8350			5	High		Wide	Skip	LKZURD
119	155.8500			5	High		Wide	Skip	LFORUU
120	155.8650			5	High		Wide	Only	(SIG)
121	155.8800			5	High		Wide	Skip	ROUNLP
122	155.8950			5	High		Wide	Only	
123	155.9100			5	High		Wide	Only	
124	155.9250			5	High		Wide	Skip	DESPLW
125	155.9400			5	High		Wide	Skip	WAUKEC
126	155.9550			5	High		Wide	Skip	KENOSS
127	155.9700			5	High		Wide	Only	RLBEAP
128	155.9850			5	High		Wide	Only	(SIG)
129	156.0000			5	High		Wide	Only	
130	156.0000			5	High		Wide	Skip	
L1	144.3000			5	High		Wide	Skip	2M L
U1	148.0000			5	High		Wide	Skip	2M U
L2	154.0000			5	High		Wide	Skip	54-55L
U2	155.0000			5	High		Wide	Skip	54-55U
L3	155.0000			5	High		Wide	Skip	55-56L
U3	156.0000			5	High		Wide	Skip	55-56U
L4	156.0000			5	High		Wide	Skip	56-57L
U4	157.0000			5	High		Wide	Skip	56-57U
L5	157.0000			5	High		Wide	Skip	57-58L
U5	158.0000			5	High		Wide	Skip	57-58U